



CAYMAN ISLANDS
T O U R I S M
A S S O C I A T I O N



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May 18th, 2005

Ms. Zoe Washnis
US Department of Transportation
Maritime Administration
MAR-610.3
Room #2126
400 7th Street SW
Washington, DC
20590

Dear Zoe;

On behalf of the Cayman Island Tourism Association (CITA) and the Cayman Islands Government, Ministry of Tourism, Environment and Commerce, we would like to extend our appreciation for your soonest review and comments in conjunction with the US EPA, on the enclosed Remediation Plan for our Shipwreck City Project. I am acting on behalf of the CITA and Ministry of Tourism for the day to day management of the "Shipwreck City Project".

As your office is aware, the Cayman Islands were approved by MARAD as the official pilot project for the donation of a ship to a foreign Government, under the "Ships to Reefs" program. We have completed our tender process on the ex-USS Kittiwake, a 251' Submarine Rescue Vessel ASR-13, and selected the Dominion Marine Group/URS/EC&C team to remediate the vessel.

Our process now entails your and EPA's review, with the resulting comments being incorporated into both our final contract with the Remediation Team and into the technical specifications of the MARAD contract for the transfer of the ship to the Cayman Islands Government. With 2 years of research and planning and our funding in place, we are anxious to secure the vessel and begin the cleaning process under both US EPA and Cayman DOE/DNR inspections.


As you will see from the enclosed submission, we have a rigorous and comprehensive plan, with a zero PCB requirement, as no PCB's can be imported into the Cayman Islands per our Environmental requirements. Hence we do not envision the need for an export permit from EPA.

We hope that your review can be expedited due to our short time window, and allow us to move forward to transfer the Kittiwake to our Government so that we may begin the cleaning process, with a goal of a late August 2005 sinking of her in Cayman.

We are a country with extremely strong environmental standards and management policies. We believe that this pilot project will be a positive example of how diligent planning with knowledgeable personnel can lay the foundation for many future mutually beneficial projects of this nature.

We anxiously await your soonest response and thank you once again for your time and attention to this matter.

Yours truly;

A handwritten signature in cursive script, appearing to read "Nancy Easterbrook", is displayed within a light blue rectangular box.

Nancy Easterbrook
Cayman Islands Tourism Association
Shipwreck City Project Manager & Board of Directors

cc. Cayman Islands Ministry of Tourism, Timothy Hubbell
Cayman Islands Ministry of Tourism, Gloria McField-Nixon
CITA, Mark Bastis, President
Timothy Mullane, Dominion Marine Group



KITTIWAKE REEF PREPARATION PLAN

May 19, 2005

Prepared for:



Shipwreck City Project
The Cayman Islands Tourist Association
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73 Lawrence Blvd., Islander Complex
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(345) 946-5658

Prepared by:



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- D Draft National Guidance: Best Management Practices for Preparing Vessels Intended to Create Reefs**
- E DMG Shipyard Health and Safety Plan**

List of Acronyms

ACM	Asbestos Containing Materials
AL	Action level
BMP	Best Management Practice
CFR	Code of Federal Regulations
CITA	Cayman Islands Tourism Association
CPR	Cardiopulmonary Resuscitation
DEQ	Virginia Department of Environmental Quality
DMG	Dominion Marine Group, Ltd.
DOT	U.S. Department of Transportation
EC&C	EC&C Incorporated
EHS	Environmental Health and Safety
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
HASP	Health and Safety Plan
Hazmat	Hazardous Materials
HAZWOPER	Hazardous Waste Operations
HEPA	High-Efficiency Particulate Air
HM/W	Hazardous Materials/Waste
IMO	International Maritime Organization
JRRF	James River Reserve Fleet
MARAD	U.S. Maritime Administration
MOA	Memorandum of Agreement
MSDS	Material Safety Data Sheet
MSO	U.S. Coast Guard Marine Safety Office
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NIOSH	National Institute of Occupational Safety and Health
NOAA	U.S. National Oceanographic and Atmospheric Administration
OPA	Oil Pollution Act
OSHA	Occupational Safety and Health Act
OSHA	U.S. Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenols
PEL	Permissible Exposure Limit
ppm	parts per million
PRAM	Prospective Risk Assessment Model
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
SOP	Standard Operating Procedure
SQG	Small Quantity Generator
SWPP	Storm Water Pollution Prevention
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, Disposal
URS	URS Corporation
USCG	U. S. Coast Guard

USGS	U.S. Geological Survey
USCGC	U.S. Coast Guard Cutter
VA	Commonwealth of Virginia
VAC	Virginia Administrative Code
VPDES	Virginia Pollution Discharge Elimination System (Permit)
XRF	X-Ray Fluorescence

Section 1 – Introduction and Project Overview

This vessel remediation plan covers all aspects of preparing the *Kittiwake* for reefing in conformance to the requirements of the Cayman Islands Department of Environment, and accordance with all applicable local, Commonwealth of Virginia and United States federal regulations. These standards are incorporated in this vessel remediation plan, and are based primarily the U.S. Environmental Protection Agency's (EPA's) and the U.S. Maritime Administration's (MARAD's) Best Management Practices (BMPs) for Preparing Vessels Intended to Create Artificial Reefs. The BMP guidance is provided in Appendix D for reference.

Dominion Marine Group, Ltd. (DMG) shall prepare for towing of the *Kittiwake* from the James River Reserve Fleet (JRRF) to the DMG Shipyard in Norfolk, Virginia. DMG will then execute the vessel remediation plan at the shipyard. In summary, this plan includes:

- **Oil and Fuel** - Removal of all fuels, oils and greases so that no visible sheen remains on tank surfaces, piping, or on any vessel component or structure, or on water when the vessel is flooded for sinking.
- **Asbestos** – Removal of all asbestos that is loose or may become loose; removal or sealing of all accessible, friable asbestos.
- **Polychlorinated biphenyls (PCBs)** – Removal of all liquid and solid PCBs.
- **Paint** – Removal of all harmful exterior hull antifouling systems that are determined to be active; remove all exfoliated paint, sweep clean all deck surfaces.
- **Other Materials of Environmental Concern** – Removal of all universal wastes such as batteries, mercury containing equipment and ozone depleting substances.
- **Solids/Debris/Floatables** – Removal of all loose debris including wood and all other materials or equipment not permanently attached to the vessel that could be transported into the water during sinking.

DMG will remove all wiring from the *Kittiwake* that could potentially contain PCBs. DMG will also remove of all PCB containing liquids, gaskets, fluorescent light fixtures, ductwork with flange gaskets, and all insulation. This will remove PCB containing materials and equipment from the ship. This cleanup level is consistent with the International Basel Convention as required for export to the Cayman Islands. This plan is more rigorous than the EPA's and MARAD's BMP, which calls for total removal of all liquid PCBs, and removal of all solid materials containing PCBs greater than or equal to (\geq) 50 parts per million (ppm) total PCBs. Since the PCB remediation plan for the *Kittiwake* will remove all PCBs, it is anticipated that an EPA RCRA required hazardous waste export permit would not be required.

DMG will do a post-remediation sampling protocol for PCBs. This evaluation will be performed in accordance with the EPA guidance document *Sampling Ships for PCBs Regulated for Disposal*; Interim Final Policy dated November 30, 1995. The post-remediation sampling plan

will include analysis of total PCBs using EPA SW-846 Method 8082, including sample preparation and extraction by EPA Method 3541, the Soxhlet extraction method.

B&T Petroleum Services will complete removal and cleaning of the fuel and oil tanks, as well as cleaning other petroleum contaminated areas. C&M Industries will provide transportation and treatment of ballast water and wastewater accumulations.

DMG has selected several waste transporters and disposal facilities for this project. Hazardous materials/waste control is a vital aspect of the larger concern of protection of employees and the environment. DMG has selected and shall subcontract with EC&C to perform environmental remediation.

DMG does not store any hazardous materials or hazardous waste product on its premises with the single exception of U.S. Department of Transportation (DOT) approved shipping containers. These containers are necessary to contain hazardous materials/waste while the remediation work being performed by DMG subcontractors is underway. These containers will typically be shipped within 30 days using an approved and licensed hazardous material/waste transporter. All solid and hazardous wastes generated from remediation of the *Kittiwake* will be disposed of at approved, licensed and permitted solid and hazardous materials/waste disposal facilities. DMG shall provide copies of all hazardous wastes manifests to the Cayman Islands Shipwreck City Team upon completion of the project.

Once portions of the *Kittiwake* superstructure has been cleaned and cleared of contaminants, hazardous materials/waste, and other materials (to include carpet, lagging, wood, plastics, and non-ferrous attachments as required by the Cayman Islands), DMG will begin to cut the superstructure for diver access and diver safety. DMG will probably not make the final diver-safety cuts to the superstructure, which will occur once the vessel arrives at Georgetown Harbour, Grand Cayman for final dive cutouts preparation. Steel portions of the ship removed will be placed into a scrap metal container for transportation to SIMS Metals Chesapeake Recycling facility for processing.

CITA and West Indian Marine will develop locations for diver safety cutouts as part of the reefing plan. Final diver safety cutouts will be completed in Georgetown Harbour just prior to sinking. West Indian Marine is the contractor that will sink the *Kittiwake* in the location already approved by the Cayman Islands.

Section 2 – Facility Description

2.1 Facilities Location

The DMG Shipyard is located at 425 Campostella Road in Norfolk, Virginia on the eastern branch of Elizabeth River. The shipyard location is illustrated in Figure 1 (see next page). Our slips have direct access to deep-water commercial channels leading through Norfolk, Virginia, to the Chesapeake Bay. Because of proximity of our location to the James River Reserve Fleet, the tow to DMG is entirely inland navigable water and approximately a 6-hour tow. A chart showing the tow route from the JRRF to the DMG Facility is provided as Figure 2.

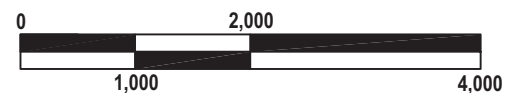
The yard and waterfront are in an unnamed cove on the south side of the Elizabeth River, southwest of the Campostella Bridge. The facility consists of a fenced in yard facility just over ½ acre of land and over two acres of deeded water, including the south and western cove upland. Water depths at the DMG Shipyard run from 1 foot to 18 feet mean low water. An aerial view of the shipyard is provided in Figure 3.



Source: USGS Norfolk South Quadrangle
7.5 Minute Series Topographic Map
Norfolk, VA 1965, Photo Revised 1986
Scale 1:24,000
1 inch = 2,000 feet



Scale in Feet



TITLE

DMG Shipyard Location Map



277 Bendix Rd., Suite 500
Virginia Beach, VA 23452
Telephone: (757) 499-4224
Fax: (757) 473-8214

DMG
425 Campostella Road
Norfolk, VA 23523

DATE
1/14/05
DR
LAG
CK
EMD

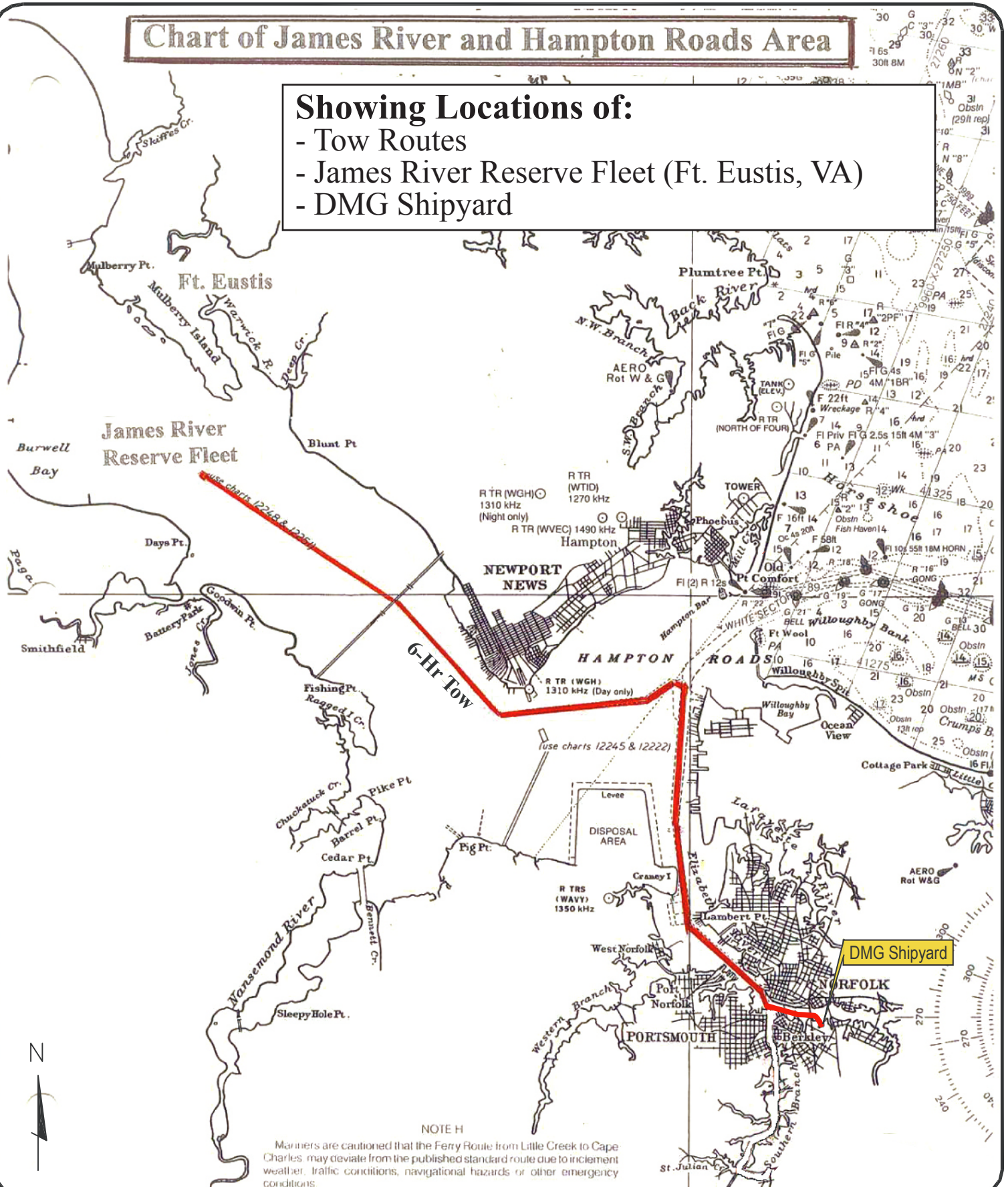
JOB NO. 11655890.10000
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Figure 1

Chart of James River and Hampton Roads Area

Showing Locations of:

- Tow Routes
- James River Reserve Fleet (Ft. Eustis, VA)
- DMG Shipyard



TITLE

Tow Route

DATE
2-25-05

JOB NO. 11655890.10000

DR
LAG

SKETCH NO.

CK
EMD

Figure 2

URS

277 Bendix Rd., Suite 500
Virginia Beach, VA 23452
Telephone: (757) 499-4224
Fax: (757) 473-8214

DMG
425 Campostella Road
Norfolk, VA 23523



..... Property Boundry

TITLE

Aerial View of DMG Shipyard



277 Bendix Rd., Suite 500
Virginia Beach, VA 23452
Telephone: (757) 499-4224
Fax: (757) 473-8214

DMG
425 Campostella Road
Norfolk, VA 23523

DATE
1-14-05

DR
LAG

CK
EMD

JOB NO. 11655890.10000

SKETCH NO.

Figure 3

Section 3 - Description of Current Work Force

3.1 Marine Experience

Dominion Marine Group, Ltd. was incorporated in June 2003. We are a provider of marine services including marine salvage, wreck removal, barge and ship repair, tank cleaning and gas free services, vessel conversion, and vessel reefing. To date DMG has environmentally prepared and reefed 17 vessels from 105-foot ship-docking tugboats to a 180-foot buoy tender. A summary of experience applicable to this project includes:

- Make ready for tow of the Mormac Dawn - JRRF to ESCO Brownsville;
- Remediation and tank cleaning/conversion of NOAA Ship Ferrel (subcontractor to Allstar Metals);
- Prepared, towed and sunk shipdocking tugboats Yatanocos and A.J. McAllister for State of New Jersey (for reef);
- Prepared, towed and sunk Kings Point, Georgia Moran, Lady Dee for State of New Jersey;
- Prepared, towed and sunk Vincent Turecamo for State of Georgia;
- Prepared, towed and sunk Barbara McAllister, Reid McAllister for State of Georgia;
- Prepared, towed and sunk tug Wilmington for State of South Carolina;
- Removed main and auxiliary machinery from USCGC Spar for Vane Line Bunkering;
- Converted tank barges BT-120 and BT-195 into deck barges for Langenfelder Marine;
- Prepared, towed and sunk USCGC Spar for State of North Carolina (artificial reef);

3.2 DMG Personnel and Certifications

DMG Program Manager, Superintendents and Foremen are all personnel experienced in ship repair and dismantling with on-site and off-site formal work and safety training to OSHA Certification standards. The management team are all Competent Person trained, have current 24-hour and 40-hour HAZWOPER training and certifications covering Hazardous Materials, Confined Space, On-Board Fire Prevention, and CPR/First Aid Training. Resumes of key DMG

personnel are detailed in Appendix A. Copies of OSHA and other certifications necessary for safe operation of the Shipyard are assembled in Appendix B.

3.3 Subcontractor Qualifications

DMG subcontractors are a vital segment of our work force. For that reason, DMG is extremely careful to select subcontractors who have displayed outstanding working relations with DMG on past projects. DMG subcontractors have, as a general rule, performed contract work for DMG on prior projects. As part of qualifying for such subcontract work, they provide DMG with copies of all training and certifications their employees maintain to conduct their assigned tasks. DMG subcontractors all have experienced personnel on their staffs.

All DMG subcontractors perform specific job assignments regarding remediation of hazardous waste and recyclable materials or other aspects of ship reefing or ship breaking. Prior to beginning a specific project for DMG, subcontractors are required to bring all their company and employee certifications current and submit file copies of all necessary paperwork with the DMG Program Manager.

DMG subcontractors must have written Environmental Compliance Plans and Employee Safety and Health Plans in force. These Plans must meet the same standards that DMG Plans meet. DMG subcontractors have established Corrective Action Procedures in place. Such corrective action on DMG projects must be coordinated with the DMG Program Manager.

DMG subcontractors are specifically selected for the training and experience of their personnel. The subcontractor management is required to maintain all necessary training and certification of their personnel and to keep DMG informed of this status. Subcontractors are also required to maintain proper licenses, permits and insurance. EPA Identification and other licenses and permits for our primary work partners are provided below.

3.3.1 C & M Industries, Inc.

Located in Chesapeake, Virginia, C&M processes and disposes of various liquid and solid waste materials. Their EPA Identification Number, Hazardous Waste Transporter Permit, Industrial Waste Water Discharge Permit are listed below:

EPA ID VAR 000004721

VA Hazardous Waste Transporter Permit VAR 0000047215

Hampton Roads Sanitation District Industrial Wastewater Discharge Permit No. 0412

C & M maintains proper liability insurance through Towne Insurance Agency, Inc., Chesapeake, VA. C & M customers include Department of Defense, Chesapeake Terminal, Inc, U.S. Army Corps of Engineers, Langley Air Force Base, U.S. Coast Guard, City of Chesapeake, Seimens/Westinghouse, URS Corp, and B & T Petroleum Recovery.

3.3.2 EC&C

EC&C is a woman-owned corporation headquartered in Virginia Beach, Virginia and specializes in hazardous material and waste remediation. They have a Virginia Class A Contractor's License and hold current Virginia Asbestos and Lead Contractor licenses:

VA Class A Contractor's License No. 2705 050396A

VA Asbestos Contractor No. 3306 000702

VA Lead Contractor No. 3358 000283

All employees of EC&C have current VA asbestos and lead licenses. EC&C uses Asbestos Waste Services as their licensed transporter of hazardous materials to BFI, King & Queens County, Little Plymouth, VA, for asbestos disposal and Michigan Disposal Waste Treatment Plant in Wayne County, MI, for lead and PCB disposal.

A summary of completed remediation projects for EC&C includes the JRRF Ship *Sara Lykes*, NOAA Ship Ferrel, APL-57, *EX Spiegel Grove* and *Nuevo San Juan*, Great Lakes ore freighter *Elm Glen*, ocean-going tugs *Swan Point*, *Sea Star*, *A.J McAllister* and *James Michael* for Bay Bridge Enterprises, LLC, Marshall Wythe Law School and Yates Hall for College of William & Mary, Federal Courthouse in Norfolk, VA, US Navy Shipboard lead abatement.

3.3.3 B & T Petroleum Recovery Services

B&T, headquartered in Norfolk, Virginia, is a minority-owned and managed industrial cleaning facility, specializing in vessel tank cleaning. Gas freeing, waste petroleum and water removal. B & T personnel are experienced and trained in Competent Person, 40-hour OSHA/HAZWOPER Certifications, and Permit-Required Confined Space Entry. B & T client list includes Norshipco, Associate Naval Architect, Lyons Shipyard, and D. Davis Boat Works.

3.3.4 URS Corporation

The URS Hampton Roads office locally has over 150 engineers, scientists, technicians and support staff. All URS personnel supporting DMG for the Kittiwake project are 40-hour OSHA HAZWOPER trained with current refresher training. Many of the support staff have significant USCG and US Navy experience and have completed extensive shipboard fire, hazard and safety training. All URS on-site compliance supervisors have completed the OSHA HAZWOPER

Supervisor training course and have current first aid and adult CPR certifications. All URS personnel are in the URS HAZWOPER occupational medical monitoring program.

URS Corporation has provided environmental, health and safety support services to Bay Bridge Enterprises and DMG. URS will provide planning, hazardous materials abatement monitoring, regulatory compliance and coordination, management and risk assessment support, and independent EH&S compliance oversight. For the 5th year in a row, URS is ranked the No.1 Hazardous Waste and No.1 Site Assessment/ Remediation Firm in the Nation by *Engineering News-Record*. They have completed development of hazardous materials removal plans and provided oversight of removal actions for several US Navy ships in Suisan Bay, CA. URS has also provided manpower for Level B confined space ship hold entry and shipyard USCG, OSHA and USEPA compliance audits in the Hampton Roads, VA area.

URS is working closely with the US Navy in research and development of the prospective fish assessment model (PRAM) tool used to evaluate the risks from PCB contaminants on reefed ships. The model is currently being applied to the *Ex-Oriskany* in anticipation for reefing in Florida waters as part of the US Navy's reefing pilot program. URS has also assisted a ship scrapping facility on the West Coast acquire the necessary permits and completed other site work in support of a successful fishing boat scrapping program.

3.3.5 Marine Inspections of Tidewater

DMG will utilize Mr. John Walker of Marine Inspections of Tidewater as the project certified Marine Chemist. Mr. Walker holds Marine Chemist Certification No.628. Considered an integral working partner, Mr. Walker has extensive experience working with DMG and assisted with the USCGC Spar, Kings Point, NOAA Ferrel, Georgia Moran, Bay King, Megan Sue, Lady Dee, BT-195 and *Spiegel Grove* reefing preparation projects. Mr. Walker was instrumental in efficiently certifying gas free tanks and enclosed spaces and the hot work in a timely manner to achieve the highly aggressive work schedule. He was also instrumental in consulting with DMG on its Health and Safety Program, providing Shipyard Competent Person Course training as well as on-the-job refreshers, and consulting with DMG on USCG and OSHA regulations relating to ship reefing and ship breaking operations.

Contact information for DMG and DMG's work partners along with their primary assignments are provided in the following table.

Table 3-1. Major Contractors

<p><u>Reefing Preparation</u> Timothy Mullane, Vice President Shipyard Program Project Manager Dominion Marine Group, Ltd. 801 Broad Street, Suite 202 Portsmouth, VA 23707 Tel: 757.397.1243 Fax: 757.397.1384 Email: tmullane@dominionmarine.net</p>	<p><u>Hazmat Remediation</u> Steven F. Avery, Project Manager E C & C Corporation 4434 Gull's Quay Virginia Beach, VA 23455 Tel: 757.464.0044 Fax: 757.464.5235 Email: onebjaj@cox.net</p>
<p><u>Tank Cleaning</u> Timothy Mullane, Vice President Shipyard Program Project Manager Dominion Marine Group, Ltd. 801 Broad Street, Suite 202 Portsmouth, VA 23707 Tel: 757.397.1243</p>	<p><u>Tank Cleaning</u> Robert White, General Manager B&T Petroleum Recovery Services, Inc. 3334 Tail Terrace Norfolk, VA 23513 Tel: 757.857.1931 Fax: 757.857.3880</p>
<p><u>Transportation and Disposal</u> Richard Wilson Asbestos Waste Services 412 Oak Mears Crescent, Suite 203 Virginia Beach, VA 23462-4200 Tel: 757.497.6194</p>	<p><u>Transportation and Disposal</u> BFI, King & Queens County (asbestos) Route 609 & 614 Little Plymouth, VA Tel:</p>
<p><u>Transportation and Disposal</u> Michigan Disposal Waste Treatment Plant (lead & PCB) Van Buren Township, Wayne County, MI Tel:</p>	<p><u>Transportation and Disposal</u> Anthony Mitchum, Senior Vice President C & M Industries, Inc. 121 Republic Road Chesapeake, VA 23324 Tel: 757.543.8775 Fax: 757.545.4386</p>
<p><u>Towing</u> Capt. William Douglas, GM McAllister Towing of Virginia, Inc. 2600 Washington Norfolk, VA 23607 Tel: 757.627.3651</p>	<p><u>Towing</u> Capt. Joe Krause Krause Marine Towing of Virginia, Inc Lamberts Point Norfolk, VA 23410 Tel: 757.623.0035</p>
<p><u>Environmental, Health & Safety</u> Ed Dullaghan, P.G., Principal Scientist URS Corporation 277 Bendix Road, Suite 500 Virginia Beach, VA 23452 Tel: 757.499.4224 Fax: 757.473.8214 Email: ed_dullaghan@urscorp.com</p>	<p><u>Marine Chemist</u> John Walker Marine Inspections of Tidewater, inc. 3081 Stratford Court Chesapeake, VA 23321-5825 Tel 757 484 8760</p>

Section 4 – Project Management

4.1 DMG Management and Organization

The core personnel of the DMG project team have long-term experience in the ship remediation and ship dismantling industry. The key personnel are as follows:

- Timothy Mullane – Vice President and Program Manager, DMG
- Tim Fitzgerald – Shipyard Superintendent, DMG

These key supervisory people hold the necessary certifications earned by completion of formal, off-site training. Several subcontractors have been selected to support remediation of the *Kittiwake*. Subcontractors and tasks that they will be responsible for include:

- EC&C, hazardous material/hazardous waste removal
- B&T, petroleum recovery services and tank cleaning
- C&M, wastewater removal and treatment, and
- URS, environmental, health and safety support services.

Resumes and Certifications are provided in Appendix A and B, respectively. DMG employees do not perform work involving hazardous materials/waste. DMG does not warehouse or store hazardous waste products on its premises. Any and all work involving hazardous waste is assigned to subcontractors with correctly trained, certified and experienced management, supervision and personnel and all necessary licenses, permits and insurance coverage. All remediated and removed hazardous materials/waste is transferred to OSHA/EPA approved containers and transported to EPA approved disposal sites by properly licensed DMG subcontractor(s).

4.2 Subcontractor Management

Subcontractors are considered an integral part of the DMG work force. Subcontractor supervisors are treated and expected to perform in the same manner as DMG Supervisors. The subcontractor Site Supervisors are required to direct their personnel in a prudent, safe manner in compliance with all applicable regulations and regulatory agency protocols and procedures and their own DMG approved EH&S plans. They are expected to be intimately familiar with the nature and extent of the work required of them and to assure that the work is conducted and completed in accordance with the subcontract and performance schedule agreed to prior to start of the task.

4.3 Management Control of Performance Schedule and Costs

Cost control is maintained at DMG via two overlapping management tools: 1) an overall forecast and associated budget of the ship scrapping project(s) and 2) daily/weekly production status meetings. The overall forecast and budget is established by the Program Manager with specific

input from the pertinent Superintendents and subcontractor Managers to define the production steps necessary to accomplish the specific task and timeline to handle the task. The Program Manager maintains a Gantt Critical Path/Time Line chart showing the sequencing of production steps necessary in the remediation project as originally planned and an overlay of actual current progress

Once docking and the initial vessel survey has been completed for the *Kittiwake*, management of the selected subcontractors meet with the DMG Program Manager for a project kick-off meeting to coordinate assigned work tasks and schedules. As work progresses, the Program Manager will hold daily and/or weekly production status meetings with the DMG Superintendents and subcontract Managers. The agenda of these meetings shall include:

- Presentation of current project schedule using the Gantt Critical Path chart,
- A report by the Superintendents and Managers of work accomplished during the week and whether work is on/ahead/behind budget by percentage of task completion,
- If behind schedule or over cost, define and delegate the corrective action to be taken, and
- The schedule of manpower and tasks planned for the next week.

Once the status meeting is completed, the Gantt Critical Path Chart will be updated and distributed to all managers.

4.4 Performance Schedule

MARAD is requiring EPA's review and comment of this plan prior to transfer of the *Kittiwake* to the Cayman Islands Government. Assuming that the EPA can provide comments by June 1, 2005, the following schedule can be met.

Milestone	Due Date
Submittal of Reef Preparation Plan	May 19, 2005
Receipt of Comments by EPA	June 1, 2005
Transfer of Title by MARAD	June 3, 2005
Prep and Tow ship to DMG	June 10, 2005
Remediate Kittiwake	August 9, 2005
Complete post remediation and tow Inspections by EPA, USCG	August 12, 2005
Kittiwake Ready for Tow to Cayman Islands	August 17, 2005

Section 5 – Ship Reef Preparation Methodology

The following details the methodology used by DMG to evaluate, analyze, remediate, and otherwise prepare the *Kittiwake* for reefing.

5.1 Preparation for Towing

Prior to the vessel being accepted by DMG for tow, the following actions will occur:

1. The vessel is to be assessed for suitability to tow. The vessel hull must be in sound enough condition to make the proposed tow. Any corrective actions and any special conditions required shall be completed to ensure a safe voyage.
2. DMG line-handling and riding crews are to be notified in advance of any items they may need to ensure a safe transit, i.e.: flashlights, floatation vests, heaving lines, first aid kit, drinking water, marine radios, etc.
3. Vessel is to have a preliminary hazards assessment to ensure the safety of the line-handling and riding crew.
4. DMG is to have a designated Superintendent onboard for the entire towing evolution. The Superintendent is responsible for the safety of the crew, coordinating between the River Pilot, line-handling crew, and DMG Shipyard Program Manager.

The following actions must be taken before actual towing can be initiated:

1. Vessel is to have a complete tank survey, to include quantity and types of products in the tanks. This survey is to be accomplished with a minimum of two people, at least one of which is to be a DMG Shipyard Competent Person.
2. Vessel is to have a draft assessment that includes the maximum height and draft of the vessel.
3. In accordance with USCG Regulations, a dead-ship towing proposal is to be submitted to MSO Hampton Roads at least 48 hours prior to the tow. Included in this submittal is to be a tank plan, with attached soundings/quantities, forward and aft drafts, air draft, length of vessel, official number of vessel, names and horsepower of assist tugboats, and 24 hour contact number for responsible party.

Tow of the *Kittiwake* to DMG shall be in accordance with the tow plan submitted to MSO Hampton Roads.

5.2 Mooring and Ship Security

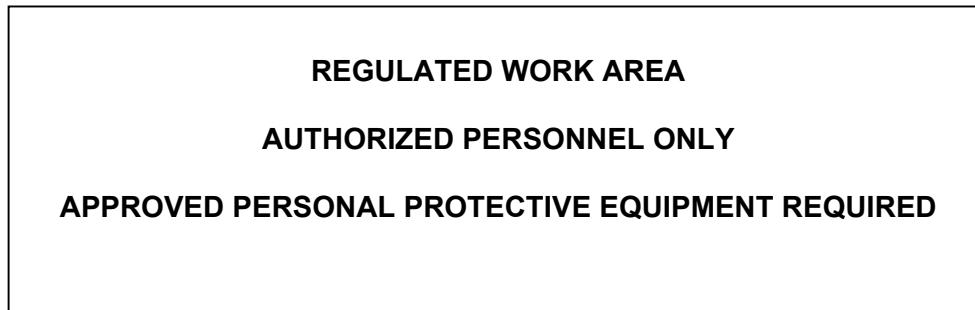
Once the ship arrives at the shipyard, the Marine Surveyor is to survey and make any

recommendations to ensure that vessel is properly moored and safe for heavy weather, and is to make a full report to Shipyard Program Manager and Insurance Underwriters.

Immediately after a ship is moored at the DMG facility, the ship is declared off limits to all unauthorized personnel and visitors. This is done as a health and safety precaution and for ship security. The following procedure is also fully detailed in the DMG Health and Safety Plan (HASP) contained in Part 4 of this TCP.

5.2.1 *Restricted Entrance*

As detailed in the HASP, a gated gangway that is locked and/or guarded is installed as the egress and exit from the ship. The gated facility entrance and the gangway gate shall be posted with the following sign:



5.2.1 *Authorized Entry*

No one is allowed entry beyond the gangway gate unless under the direct supervision of an authorized DMG or subcontractor Site Supervisor. This includes all working personnel, all other DMG personnel and all visitors.

5.2.3 *Visitors*

All visitors must be specifically approved and authorized by the Program Manager and a numbered badge issued before being allowed on board. A Site Supervisor must personally escort the visitor at all times the visitor is on board.

5.3 Initial Vessel Survey and Preparation for Work

5.3.1 *On-Board Hazards Assessment*

The ship must be assessed to determine all attributes of potential on-board hazards. A hazards assessment will be completed once the vessel is moored and ship security is in place. A hazards assessment team will meet, review the project goals and objectives, and then complete the hazards assessment. The hazards assessment team shall consist of the DMG Program Manager, DMG Vessel Superintendent, DMG EHS Supervisor, Certified Marine Chemist and the

designated supervisors from all of the primary vessel abatement subcontractors.

The vessel is to be assessed for safety hazards, the security of all shipboard ladders and handrails/lifelines, the presence of any damaged, exposed, or friable PACM, any leaking containers or piping, and any other potential hazards during the hazards assessment. The hazards assessment phase is also the time when DMG and their subcontractors are to familiarize themselves with the vessel in an intimate manner, so as to be able to then review and update the TCP schedule.

Following the hazards assessment phase, a meeting will be held to discuss the overall and specific safety requirements and corrective action that must be taken prior to the start of any work phase on the vessel. It is during this meeting that discussions are to be held between DMG and all subcontractors regarding the refining of work plans and project coordination among the ship remediation team.

5.3.2 Sampling & Analysis of Hazardous Materials

DMG uses the services of EC&C, VA licensed and certified lead and asbestos inspectors and hazardous waste/materials abatement professionals to conduct all required sampling and abatement. As required, EC&C will forward any post-abatement confirmation samples to certified environmental laboratories for analysis of hazardous waste/materials. Details regarding specific sampling and analytical methods are described in detail in the SOPs to be used for this project (see Section 2 of the HASP, Appendix E).

DMG's environmental subcontractor EC&C has reviewed the environmental survey information on the *Ex-Kittiwake* from the JRRF (see Appendix C) and completed a detailed inspection of the vessel. EC&C has already estimated quantities to be removed. EC&C shall finalize remediation plans for the removal and disposal of hazardous materials and wastes during the onboard hazards assessment. The plan will include the proposed location and construction of decontamination facilities, and placement of temporary hazardous materials/waste storage areas.

5.4 Approval of Subcontractor Work Plans

Hazardous material/waste abatement and removal work plans by DMG subcontractors shall be approved by the DMG Program Manager before any work is initiated. In general all work plans will conform to the following.

1. DMG maintains a policy that DMG employees are forbidden to enter or engage in environmental abatement work including the entry of containment areas.
2. Smaller ships will normally have one environmental crew assigned, starting at the bow working aft, and starting at the top working down.

The finalized work plans shall include the posting of signs, securing and repair of lifelines and handrails, and the repair or removal of any unsafe ladders or other hazards. The environmental

team will establish containment areas and to abate any biological hazards (guano) that may be present. The team will also ensure that work areas are clean, make repairs, and install temporary lighting, firefighting equipment, and any other measure to make the workplace as safe as possible.

It shall be the responsibility of the vessel superintendent to ensure that the vessel is kept safe every day, and to perform a daily inspection with the team supervisors onboard said vessel. The subcontractor environmental supervisors shall be held responsible for ensuring the safety in any containment areas.

5.5 Finalization of Ship Remediation Schedule

After the ship has been safely delivered to DMG, properly moored, safe ingress and egress has been secured, the hazards analysis has been completed, and finalized work plans reviewed, the ship remediation schedule will be reviewed by the project team and approved by the DMG Program Manager. A final schedule will be developed and forwarded to the CITA Project Manager.

5.6 Signage and Barricades

In accordance with the DMG HASP, OSHA approved general accident prevention signs, tags, and notices will be used and made visible at all times when work is being performed, and removed promptly when the hazard no longer exists. All employees and subcontractors will obey all safety signs and tags.

Barricades, handrails, lifelines should be at least 42 inches high, and should provide a physical barrier. Caution tape is never an acceptable barricade method, as it only provides a visual barrier and is considered more of a visual warning method and not an acceptable barricade.

Confined spaces and tanks must have a "Safe For Entry" Certificate posted at the entrance before any work is started. This certificate can only be posted and maintained by a certified Marine Chemist or a Shipyard Competent Person and only if conditions allow. All requirements of the certificate must be followed and only personnel properly trained and qualified shall be permitted to enter these areas. Should any change in conditions occur, the Vessel Superintendent or Safety Supervisor must immediately be notified and access to the space must be prevented until the certified Marine Chemist or Shipyard Competent Person verifies that the conditions are safe for human entry.

All holes or openings through decks or bulkheads less than 3 feet above deck level must be properly identified and barricaded immediately. Material and equipment must never be stored on a hole cover.

5.7 Safety Equipment

After the above On Board Hazards Survey, all unsafe barricades, railings, ladders and/or flooring,

etc will be repaired or removed as necessary. All necessary fire protection equipment, lifelines and buoys, spill containment equipment will be put in place.

5.8 Construction of Negative Air Pressure HM/HW Work Areas

Sections of the vessel containing HM/HW will be sealed and a mechanical HEPA filtered exhaust system, directed away from workers, installed in such a manner that a negative air pressure can be maintained for the work area and meet the appropriate OSHA air changes per hour requirement and as re-affirmed in the DMG HASP.

5.9 Installation of Portable Decontamination/Shower/Clean Room

Portable unit(s) will be installed adjacent to work area(s) involving HM/HW remediation work to comply with the OSHA requirements pertaining to safety and sanitary issues of personnel entering and leaving areas containing HM/HW. The air exhausts and water outlets of these units will be appropriately filtered.

5.10 Monitoring Environmental Compliance

Environmental Compliance in the DMG workplace is the cooperative responsibility of all DMG personnel from the hourly worker to the company executives.

On a day-to-day basis, the Site Supervisors are required to conduct the work efforts of their crews in such a manner that all work is in compliance with environmental regulations.

The DMG subcontractor URS is charged with Safety Oversight and Environmental Compliance responsibility shall monitor compliance and is responsible for communicating the necessary environmental compliance issues to all DMG and subcontractor personnel and to help correct any infractions.

5.11 Monitoring Employee Health and Safety

Employee Safety and Health are the responsibility of all DMG personnel. All DMG employees are formally trained in the DMG rules and regulations regarding safe work practices and conditions. All DMG employees are expected to obey all DMG EHS rules. The DMG EHS Manager is responsible for communicating the necessary personnel safety and health protective issues to all DMG and subcontractor personnel and to help correct any infractions.

5.12 HM/HW Abatement and Removal

Hazardous waste must be stored, transported, and disposed of in accordance with federal Resource Conservation and Recovery Act (RCRA) and Virginia State laws. The DMG facility is

a registered small quantity generator (SQG) with EPA ID No. VAR000509281 and will adhere to all applicable requirements described in the RCRA regulations (refer to 40 CFR Part 262). The DMG policy meets or exceeds all hazardous waste handling and disposal requirements under the RCRA-SQG regulations. Additional information on regulatory compliance requirements and hazardous materials/hazardous waste management for this project is provided in Section 7.

DMG maintains a policy of limiting the storage and handling of waste materials. To accomplish this policy, roll-on/roll-off containers will be placed on or in the vessel. The containers will be OSHA/EPA appropriate for the material to be handled, and will be marked with the material to be placed inside, and the vessel name and/or ID number for tracking purposes.

When the container is full or ready to be removed, it will be removed from the vessel by crane and immediately transported for processing/disposal by our EPA approved waste disposal subcontractor.

5.13 Tank Cleaning and Ship Stability

When the removal crew has completed and cleared the forward area of the vessel, the tank cleaning crew can then begin the cleaning and gas freeing of all tanks, starting from the bow and working aft.

The DMG Program Manager is to monitor the stability of the vessel at all times and to call in the necessary stability engineers to calculate any needed changes to the trim or draft of the vessel and any ballasting/deballasting that may be necessary to keep the vessel on an even keel.

All fluids and contents of the vessels tanks are to be handled as contaminated material and transported to an appropriate processing facility for disposal/recycling.

All rainwater and other bilge contents onboard the vessel is to be collected and transported to an appropriate processing facility for disposal/recycling.

DMG prohibits the discharge of any product, material, or fluid into the river system. Any discharge, accidental or intentional, will be reported to the proper regulatory agencies and rapid measures must be taken to contain any spilled material.

DMG policy is that prior to any oil or wastewater transfers of any type, the slip is to be boomed off. During the containment boom deployment, special attention is to be given to ensure the boom is not twisted and the boom should have 25 pound anchors placed in places in the length of it to ensure that it is kept free from snagging on the vessel. The boom should be secured to the bulkheads in a method that eliminates gaps where potential spills could escape.

Hot work should normally be stopped on any vessel undergoing tank cleaning/oil transfer.

5.14 Diver Safety Preparation Operations

Note: USCG must be informed prior to the daily initiation of hot work. The initials of the USCG representative shall be entered into the DMG daily work logbook. The USCG representative is reached by phone at 757-484-8192.

As required by the CITA diver safety preparation plan, booms, cranes, or other topside superstructures items may be removed starting from the bow and working aft. This work is to be accomplished after the area has been cleared by the environmental team but prior to the tank cleaning team moving in.

Special procedures need to be followed prior to the cutting or burning of any hollow structures due to the prevalence of hydrogen gas. A Certified Marine Chemist must inspect and specify the procedure to be followed prior to the issuance of any "hot work" certificate for hollow structures.

During removal or moving booms, masts, or other superstructure items it is important to secure and barricade the area around this work and to ensure that no other team members enter the area. The purpose of this work is to reduce the top weight of the vessel to eventually allow for the complete tank cleaning and deballasting of the vessel. The DMG Program Manager is responsible to ensure that a crane of sufficient size is dedicated to the completion of this operation.

The DMG Shipyard Supervisor is to ensure that proper safety is observed at all times, and is to direct the installation of fire lines prior to the commencement of hot work. In addition to fire lines, there is to be adequate fire extinguishers placed onboard, which will be placed when the vessel first arrived at DMG.

The Superintendent is responsible for ensuring that all extinguishers are charged, and should test the fire hoses for sufficiency every morning prior to the start of work and after the lunch break. The morning test should be performed in the presence of the DMG Shipyard Supervisor and so logged in the daily Competent Person logbook. The logbooks and records are to be maintained for a minimum of 3 months.

No slag, paint, dirt, dust or other potential pollutants are allowed to enter the waterway. Barges and work floats with catch aprons (fireproof hot-work blankets) shall be placed in any areas where the potential for these materials to fall to the waterway exist. All barges, work floats, and spill plates must be regularly cleaned, with the sweepings collected and loaded into the paint/shipboard sweepings container for the vessel.

Section 6 – Health and Safety Program

6.1 DMG Health, Safety and Environmental Policy

DMG is committed to business practices, operations, and projects that protect people and the environment. DMG understands that ship repair and dismantling can be a dangerous endeavor. The basis for our health, safety, and environmental programs is that accidents causing injuries or illness to personnel or impact on the environment are preventable. It is everyone's obligation to prevent accidents, and all personnel are expected to conduct business in a manner that actively integrates the elements of the DMG Health and Safety Program into applicable aspects of DMG shipyard operations.

The goal of the DMG Health and Safety Program is zero accidents; therefore, accident prevention continues to be of paramount importance to the company. To this end, safety takes precedence over expediency.

DMG is committed to compliance with all federal, state and local health, safety, and environmental requirements.

DMG has established procedures that provide direction on health and safety matters to all employees. These procedures are periodically evaluated in light of current case law, new regulations, and emerging industry practices.

Both management and employees have the responsibility through personal example to create a climate in which everyone shares a concern for their own safety and the safety of their fellow workers.

6.2 Health and Safety Plan Report Organization

This HASP (see Appendix E) includes those elements typically requested by the MARAD in its requirements for a Technical Compliance Plan. The HASP is presented as follows:

Section 1: presents DMG's EHS policy and the report organization;

Section 2: describes all process control procedures applicable to remediation and dismantlement of obsolete ships;

Section 3: describes DMG's personnel protection program;

Section 4: describes DMG's Shipyard Security; and

Section 5: discusses DMG's shipyard contingency plans.

Section 7 – Regulatory Compliance

Federal, State and local protocols and regulations control the work environment of DMG. As applicable, they are incorporated into this ship remediation plan and the DMG Shipyard HASP (see Appendix E). DMG shall ensure all hazardous materials/waste removal and disposal operations shall be completed in compliance with all applicable federal, state and local statutes, U.S. statutory and regulatory requirements including the Toxic Substances Control Act (TSCA), the Resource Conservation and Recovery Act (RCRA), the Occupational Safety and Health Act (OSHA), as well as international laws, treaties and conventions and agreements, as applicable.

DMG is currently completing and anticipates approval of its facility response plans included in our forthcoming VPDES permit. DMG will ensure strict compliance with all aspects of our plans and permits, and compliance with all applicable regulations during ship remediation. DMG shall make available for inspection or provide copies to the various government agencies upon request all facility licenses and permits. DMG will only use subcontractors, transporters and treatment, storage and disposal facilities holding valid permits.

7.1 Written Environmental Compliance Operating Procedures

DMG has developed standard operating procedures (SOPs) for its written environmental, health and safety compliance requirements. These facilitate effective, uniform employee training and safety while working at our DMG Shipyard. Our SOPs include:

- Fire Prevention and Protection
- Fall Protection
- Crane and Rigging Safety
- Machine Guarding
- Hot Work Procedures
- Marine Safety
- Confined Spaces
- Lead Abatement
- Asbestos Abatement
- PCBs
- Chromated Water
- Mercury
- Ozone Depleting Substances
- Wastewater
- Handling Fuels, Oils and Lubricants
- Tank Cleaning and Gas Free Operations
- Waste Management, and
- Housekeeping.

These SOPs can be found in the DMG HASP.

7.2 Environmental Compliance Record Keeping

There are minimum record keeping compliance requirements with the various applicable regulations for our facility in general and for ship remediation operations. DMG keeps on file all the required records and plans for safe and effective operations and to maintain regulatory compliance and reporting. For the current project, these shall include:

- VPDES permit,
- Storm Water Pollution Prevention (SWPP) Plan,
- Health and Safety Plan (HASP),
- Copies of project solid and hazardous waste manifests,
- Written Hazard Communication Plan,
- Training records including Hazardous Waste Operations, OSHA, Confined Space, Competent Shipyard Person, DOT dangerous goods, and Health and Safety,
- Hazmat Inventory,
- MSDS Sheets,
- OSHA 300 logs,
- Fire equipment inspection records,
- Compressed gas cylinder inspection records,
- Written equipment operating procedures,
- Equipment maintenance records,
- Shipyard throughput calculations and emissions data for the last five years, and
- Shipyard throughput bilge water calculations for the last five years.

Per applicable regulations, upon request DMG shall make available for inspection to the various agencies the above records, reports and plans.

7.3 Procedures for Mitigating Pollution

DMG will maintain a spill response plan as part of the storm water pollution prevention plan. DMG will comply with all aspects of its VPDES Permit. Additionally, DMG has developed contingency plans for mitigating pollution spills that are presented in Section 5 of the HASP.

7.4 Employee Training and Certifications

DMG personnel training and certifications are current and valid for shipyard managers, superintendents, and foremen. Additionally, DMG's subcontractors selected for these projects also have all appropriate training and certifications. Copies of resumes and certifications are provided in Appendix A and B, respectively.

7.5 Hazardous Material/Waste Company Policy

DMG's policy regarding hazardous material and hazardous waste is that DMG does not allow its employees to perform work involving any material or waste product that OSHA or EPA considers hazardous to the safety and health of employees or the environment.

DMG does not store any hazardous materials or wastes on its premises with the single exception of materials and waste generated during ship remediation activities. DOT approved shipping containers shall be used during the project and designated as temporary waste accumulation areas. The containers are necessary to contain hazardous material or waste while the remedial work performed by DMG subcontractors is underway. These containers will typically ship within 30 days. However, based on applicable RCRA SQG regulations and the anticipated disposition of the wastes, DMG subcontractors have up to 90 days to cycle out the containers using pre-approved licensed transporters.

DMG has selected several waste transporters and disposal facilities for this project (see Section 3). As part of working on this project, these subcontractors shall adhere to the requirements of this plan, their own environmental compliance plans, and all applicable federal, state and local environmental regulations.

7.6 Hazardous Material/Waste Control Procedures

Hazardous materials/waste control procedures and environmental compliance protocol for handling, removal, containment, transportation, and disposal are described herein, in DMG's HASP, and in subcontractor work plans and operational procedures. These are carefully reviewed for acceptability by DMG management. These plans and procedures shall be in accordance with the following regulations, procedures and protocols.

Federal

29 CFR 1910	Occupational Safety and Health Standards including
29 CFR 1910.15	Shipyard Employment
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1915	Occupational, Safety and Health Standards for Shipyard Employment
29 CFR 1915	Subpart Z Toxic and Hazardous Substances
40 CFR 131	Water Quality Standards
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste

40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 273	Standards for Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 761	Polychlorinated Biphenols (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions
40 CFR 763	Asbestos
49 CFR 171	Hazardous Materials Transportation
49 CFR 172	Hazardous Materials, Tables, and Hazardous Materials Communications

Commonwealth of Virginia

9 VAC 20-60	Hazardous Waste Regulations
9 VAC 20-80	Solid Waste Management Regulations
9 VAC 25	Water Quality Protection Regulations

Appendix A

Resumes of Key Personnel



Timothy S. Mullane

Resume: Timothy S. Mullane
Vice President & Shipyard Program Manager
Dominion Marine Group, Ltd.

Summary of Qualifications:

- Extensive and diversified experience working in the management of projects including Marine Salvage, Marine Operations, Marine Demolition, Wreck Removal, Heavy Lift Operations, Ship Repair, Reefing and Breaking.
- In-depth experience in the survey of vessels to evaluate the scrap value and environmental remediation considerations.
- Highly qualified and experienced Marine Salvage Master.

Experience: Vice President and Shipyard Program, Dominion Marine Group, Ltd.

Jul '03 to Present Responsible for business development, shipyard operations, and reefing development projects. Some the significant work completed in the last 18 months includes DMG has environmentally prepared and reefed 17 vessels from 105-foot shipdocking tugboats to a 180-foot buoy tender.

- Make ready for tow of the Mormac Dawn - JRRF to ESCO Brownsville;
- Remediation and tank cleaning/conversion of NOAA Ship Ferrel (subcontractor to Allstar Metals);
- Prepared, towed and sunk shipdocking tugboats Yatanocos and A.J. McAllister for State of New Jersey (for reef);
- Prepared, towed and sunk Kings Point, Georgia Moran, Lady Dee for State of New Jersey;
- Prepared, towed and sunk Vincent Turecamo for State of Georgia;
- Prepared, towed and sunk Barbara McAllister, Reid McAllister for State of Georgia;
- Prepared, towed and sunk tug Wilmington for State of South Carolina;
- Removed main and auxiliary machinery from USCGC Spar for Vane Line Bunkering;
- Converted tank barges BT-120 and BT-195 into deck barges for Langenfelder Marine;
- Prepared, towed and sunk USCGC Spar for State of North Carolina (artificial reef);
- Removal and conversion of YD-24 crane from barge for Commerce Construction;
- Prepared, towed and sunk Admiral Charlie, Pawtucket, and Titan for State of North Carolina;
- Prepared, towed and sunk ex-navy YO-153 for State of New Jersey;
- Prepared, towed and sunk Megan Sue, Bay King, and Lollipop for State of New Jersey;
- Remediated and converted SPL-57 from barracks barge into deck barge;
- Dismantled two Portal Gantry Cranes for NORSHIPCO; and,
- Scrapped GL-227, a 4,750 DWT hopper barge, in cooperation with McCallister Towing in Virginia and Titan Maritime.

Shipyard Project Manager, Bay Bridge Enterprises, LLC

**Oct '01
to July
'03**

Responsible for overall shipyard management including

- Negotiation of vessel projects and contracts
- Surveying prospective scrap and reef vessel candidates
- Estimating job costs and related job bids



Timothy S. Mullane

- Work planning, scheduling and administration of shipyard projects
- Coordination and scheduling of vessel movements in shipyard
- Salvaged equipment sales

Significant projects include:

- Reef preparation of Ex *USS Spiegel Grove*, 510' Navy LSD-32, and 110' Moran Tug *Swan Point*
- Remediation and scrapping of 688' Great Lake Ore Carrier *Elm Glen*, ocean-going tug *Sea Star*, 210' Ex- US Navy Fleet Tugs *Papago* and *Paiute*, 2 Ex MARAD YTM's, Tugboat *James Michael*, 310' Coastal Tanker *Bert Reinauer*, 110' Ocean Tug *A.J McAllister*, dredge *Deepwater* and numerous barges.

General Superintendent & Port Captain, Rusty Tug & Barge, Ltd.

**Mar '96
To Oct '01**

Oversaw and scheduled marine projects covering a fleet of 3 tugboats, 4 crane barges, and numerous support badges and equipment. Work included Tug and barge operations, marine salvage, marine demolition, ship repair and wreck removal.

Significant projects included:

- Refloated and salvaged Tugboat *Robert P. Jr.* (near Kittyhawk, NC)
- Salvage/wreck removal of fishing vessel *Juan Gabriel* (Chesapeake Bay)
- Refloated and salvaged 180' ocean tug *Parris Island*
- Tow make ready of 2 600-ft. troop carriers *General Buckner* and *General Rose*.

Vice President - Operations, Coastal Barge & Crane, Ltd

**Aug '93
Mar '96**

Served as company Operations Manager and Salvage Master. Directed many tug, barge and small ship salvage operations including:

- Salvage Master & refloat of the former 225' Chesapeake Bay Steamer *Claude Sonny Simmons*.
- Project Superintendent for dismantling/scrapping of 110' tall mock aircraft carrier fuel and firefighting training tower at Military Ocean Terminal, Bayonne, NJ.

Project Leadman/Foreman, American General Resources

**Mar '90
Aug '93**

- Directed scrapping of heavy cruiser *Albany* and Canadian Frigate *St Croix*
- Setup ship breaking yard in Terminal Island, California
- Worked on scrapping of heavy cruiser *USS Chicago*
- Worked on preparing *Casa Grande*, *Essayons* and *USS Chicago* for tow.

Training and Certifications:

- USCG 100-Gross Ton Master's License
- Certified Crane Operator
- 40-hr Hazwoper
- Basic & Advanced Shipboard Firefighting
- Confined Space Entry, First Aid and CPR Trained, Shipyard Competent Person

STEVEN E. AVERY

Summary of experience
As of September, 2004

Steven Avery joined EC& C in 1998 after serving with McDonald's Corporation for 17 years. While at McDonald's was General Manager in restaurants throughout the Tidewater Virginia Area. He was promoted to the Training Department in 1985 and was responsible for training store management, area supervisors as well as franchise owners at McDonald's System Hamburger University. Later as senior member of Training Department assisted in identification of future McDonalds store placements. Spent two years in the field assisting and training franchise owners in restaurant operations and profitability. During last assignment oversaw operations management of restaurants in 5 cities grossing over 15 million and over 1000 employees and management.

He is currently vice president and part owner of EC & C and has been active in the construction industry since 1997. He is responsible for all field operations and serves as a multiple-site project manager, supervising all supervisors and employees. His responsibilities included estimating, bidding, job costing, contract review and preparation, production scheduling and reporting, customer relations, and regulatory compliance.

Mr. Avery is licensed by the Commonwealth of Virginia as an Asbestos Supervisor and Asbestos Inspector.

Luis Vasquez

Summary of experience
As of September, 2004

Mr. Vasquez has been in the employ of EC & C since 1999. He is a seasoned supervisor and has been a Project Manager since January, 2002. As a Project Manager he oversees daily operations of all project underway by EC & C. Mr. Vasquez is a licensed asbestos supervisor and has been trained and held a Virginia lead license.

Mr. Vasquez was been instrumental in the completion of the Ex-Spiegel Grove in preparation for reefing and multiple other marine projects completed since 2002. All work was done under the supervision of EPA. His leadership in supervising and leading the crew of up to twenty employees has had a great impact on completing projects on schedule.

In addition, he has supervised many projects involving both small and large commercial and industrial projects, city schools and colleges. .

BILLY J. AVERY

Summary of experience
As of September, 2004

Mr. Avery is licensed by the Commonwealth of Virginia as an Asbestos Supervisor, Asbestos Inspector, and Asbestos Management Planner. He also holds or has held the following licenses in other states: Illinois Asbestos Inspector, New York City Investigator, New York State Inspector, and South Carolina Management Planner/Inspector, Utah Inspector, North Carolina Project Designer. He was a qualified asbestos fiber reader, participating successfully in both the NIOSH Proficiency Analytical Testing (PAT) and AIHA Asbestos Analytical Registry (AAR). He is a Virginia approved instructor for Asbestos Worker and Supervisor, Inspector/Management Planner training and has served as such since 1988. In lead programs he holds Virginia licenses in Inspector/Risk Assessment and Supervisor.

He has served as multiple-site Project Manager, supervising all foremen and workers. His responsibilities included estimating, bidding, contract preparation, production scheduling and reporting, customer relations, and regulation compliance. He actively participated as a consultant in litigation proceedings for various clients in cases brought by Illinois, Michigan and New York against asbestos producers.

Presently, he is secretary/treasurer and part owner of EC & C. In this capacity he is responsible for the office management and administration, and participates in marketing and operational planning.

Mr. Avery has been active in the construction industry since 1982 and in the environmental field since 1985. He holds a BS in Business Administration from the University of Missouri and an MBA from the University of Pittsburgh.

Resume
John Walker

Project Marine Chemist

Marine Inspections of Tidewater

Mr. Walker holds Marine Chemist Certification No. 628. Considered an integral working partner, Mr. Walker has extensive experience working with BBE and assisted with the *Spiegel Grove* reefing preparation project. Mr. Walker was instrumental in efficiently certifying gas free tanks and enclosed spaces and the hot work in a timely manner to achieve the highly aggressive work schedule.

He was also instrumental in consulting with BBE on it's Health and Safety Program, providing Shipyard Competent Person Course training as well as on-the-job refreshers, and consulting with BBE on USCG and OSHA regulations relating to ship repair and ship breaking operations.



Education

MSc. 2004/Geology/ Old Dominion University
BSc./1985/Geology/Old Dominion University
2004 Hazardous Materials/DOT Dangerous Goods Shipping Certification
8-hr Current OSHA HazWoper Refresher
40-Hour OSHA Hazardous Safety Training Course
8-Hour OSHA HazWoper Site Supervisor Safety Training Course
1998/NSVMS/Arizona State University Groundwater Modeling Course
1997/ASTM Environmental Statistics Course
1998/USEPA/USGS Monitored Natural Attenuation Seminar
1978 US Navy Basic Firefighting Training
1978 US Navy Basic Shipboard Damage Control

Registration

Professional Geologist
VA/1993 (944)
NC/1997 (1555)

Membership

- Virginia Lakes and Watershed Association
- National Groundwater Association
- American Geophysical Union
- Geologic Society of America

Years of Experience

URS: 8
Other Firms: 11

Resume: Mr. Dullaghan has over 19 years experience as a geologist and environmental consultant specializing in the design, implementation, and management of hazardous waste site investigations and site remediation. Mr. Dullaghan also has significant expertise in OSHA health and safety, and Environmental Health and Safety compliance audits. Some recent projects that demonstrate his capabilities in EH&S support services are provided below.

Range Scrap materials Management Support, CNOLANT, U.S. Naval Range Facilities, FL and NC:

Principal Scientist. Project was completed to establish compliant, safe, and effective range-derived scrap material management program by developing programmatic guidance for the fleet's land-based activities. The goal was to enhance operability of and minimizes environmental impacts to ranges. Scrap materials baseline analyses were conducted. The scrap materials baseline report summarized the findings and observations from site visits to Pinecastle Bombing Range and Navy Dare County Target Complex. Regulatory Analysis was also completed for the Range Scrap Material Management Plan. This regulatory analysis summarized the current and developing requirements of federal, Department of Defense (DoD), Department of the Navy (DoN), state, and local regulatory agencies and how these requirements apply to Navy range clearance and/or material management activities. Responsible for independent technical review of draft and final documents.

Marine Facility EHS Regulatory Support Services, Bay Bridge Enterprises, LLC, Chesapeake, VA:

Project Manager and Senior Regulatory Specialist responsible for assisting one the East Coast's largest metals reclamation and ship scrapping facility. Assisted in developing comprehensive EHS technical compliance plans for ship disposal solutions under the US DOT Maritime Administration (MARAD). Developed OSHA and USCG self-auditing compliance worksheets. Reviewed in-house EHS program and provided recommendations for implementation of improved environmental management systems (EMS). Provided ongoing consultations regarding federal PCB Mega-Rule requirements for PCB containing materials handling and disposal. Assisted in development of Ship Reefing Plans for the Southern and Gulf States under the MARAD. Prepared engineering drawings of the *General Hoyt Vandenberg* for review and development of a ship reefing plan. Reviewed the National Marine Sanctuary Artificial Reef Permitting Guidelines and provided guidance for ship reefing plan preparation and applications to MARAD.

Hazardous Materials Assessment, Vincent Tukecamo, Dominion Marine Group, Ltd., Brunswick, GA:

Principal Investigator and Project Manager. Provided support in development of hazardous materials sampling plan. Completed hazardous materials assessment. The ship was cleaned using best management practices for preparing ships for scuttling to provide artificial reef material off the coast of Georgia on behalf of the GA Department of Natural Resources (DNR).

Marine Facility EHS Regulatory Support Services, Dominion Marine Group, Ltd., Portsmouth, VA:

Project Manager and Senior Regulatory Specialist responsible for developing Health and Safety and Technical Compliance Plans for reefing of obsolete vessels under Mid-Atlantic States and the US DOT Maritime Administration (MARAD) requirements.

Plans are being developed to comply with the US EPA's best Management Practices ship reefing guidance, and are similar in nature and scope as those required for the reefing of the *Texas Clipper* and *Ex-Oriskany*.

Marine Facility Environmental, Health & Safety (EHS) Compliance Audits, Vulcan Materials Company, Norfolk, VA: Project Manager and lead auditor responsible for direction and oversight for EHS compliance audit at two waterfront aggregates materials handling facilities. Site-specific audit worksheets covered US Coast Guard, OSHA and environmental compliance requirements were developed to facilitate rapid and efficient completion of the site activities. The audit included site and waterfront facilities inspections, interviews with site personnel, site records evaluations, waste and materials handling practices, safe work practices, and compliance with VADEQ SPCC plans, its combined VADEQ/VDMR maintenance dredge permit, and its VADEQ general discharge permit. Suggested improvements in records retention and documentation, materials handling, encroachment onto wetlands, an updates to its SPCC plans were provided.

Interim Remedial Action (IRA), USCG Facility, Grand Isle, LA: Principal Scientist. Investigative activities identified very high TCLP concentrations of lead in soil at the small arms firing range on the Coast Guard facility. Mr. Dullaghan was responsible for providing direction and oversight in the preparation of the project sampling and analysis plan and the health and safety plan, for coordination and selection of subcontractors, implementation and oversight of the field effort to remove the contaminated soil. The project included surveying the excavation area, excavating discrete areas with lead contaminated soil, placing the soils into drums for transportation, and once at the disposal facility, stabilizing and landfilling the soil. An IRA report was prepared as the final project deliverable.

PCB Contaminated Soil Engineering Evaluation/Cost Analysis (EE/CA) and Design for Removal Action, Harvey Point Defense Testing Activity, U. S. Navy LANTDIV CLEAN Program, City of Hertford, NC: Principal Project Geologist. Past activities at three locations on the facility resulted in soils being contaminated with polychlorinated biphenols (Arochlor 1260). Responsible for preparation of the site health and safety plan, the work plan, the sampling and analysis plan, and the quality assurance plan. Coordinated field activities; supervised and assisted in the field program in accordance with EPA CERCLA and U.S. Navy IRP guidelines. Completed additional investigative activities in support of an EE/CA, including surveying in soil sampling grids at each location, collecting over 200 soil samples for on-site PCB analysis using an immunoassay test kit, forwarding confirmation samples for laboratory analysis, installation of temporary piezometers, and collection of groundwater samples. Soils were removed to a depth of one to two feet and stockpiled on-site. Remedial alternatives evaluated included disposal at a TCSA regulated landfill, disposal as a non-hazardous waste, incineration, on-site bioremediation, soil washing, and natural attenuation.

Environmental Facility Compliance Audit, City of Charlottesville, VA: Principal Investigator responsible for direction and oversight for an environmental facility audit at a public utility support facility in support of a site redevelopment. Site-specific audit worksheets covering the spectrum of facility environmental compliance requirements were created. With the worksheets, the comprehensive audit and assessment activities were quickly completed under a very aggressive site development selection schedule. Compliance issues included facility H&S practices, compliance with EPA RMP and PSMP planning, compliance with EPA and DOT propane storage regulations, and compliance with Virginia UST regulations. The audit included a site inspection, regulatory compliance database searches, interviews with site personnel, site records evaluations, and assessment of past waste handling practices, and UST system assessments.

Appendix B

Key Personnel Certifications



Marine Chemist Service

Certifies that

Timothy S. Mullane

has successfully completed

SHIPYARD COMPETENT PERSONS INITIAL COURSE (24 HOUR INITIAL)

with all the rights and privileges hereunto appertaining

given this 10th - 12th day of December 20 02

Competent Person's Signature

James P. Buff CMC #671
Course Director

Port Canaveral Maritime Academy, dba

Port Canaveral Marine Firefighting Training Academy, Inc. in association with Canaveral Port Authority

Certificate of Training

This certifies that

TIMOTHY S. MULLANE

Identification Number 280587012

has successfully completed a

Forty-Hour Combined Basic Advanced Marine Firefighting Course
Class Number 021202318, Certificate Number 02120218
at Port Canaveral, Florida on December 6, 2002.

This course is approved by the United States Coast Guard and the Bahamas Maritime Authority. Successful completion of this course satisfies both the *Basic and advanced firefighting requirements* of the International Maritime Organization Seafarers' Training, Certification and Watchkeeping Code Sections A-VI/1 & A-VI/3 and Tables A-VI/1-2 & A-VI/3. This course also satisfies the *basic and advanced firefighting requirements* of 46 CFR 10.205(g), 10.205(i)(2), 10.207(f) and 10.401(g)(1) for issuance of a U.S. Coast Guard license; and 46 CFR 13.113(d)(2)(i)(A), 13.113(e)(1)(i)(A) or (B), 13.201(e), 13.301(e), 13.401(e) or 13.501(e) for any U.S. Coast Guard tankerman endorsement.


D. J. Sargeant, President

Reactives Management Corporation

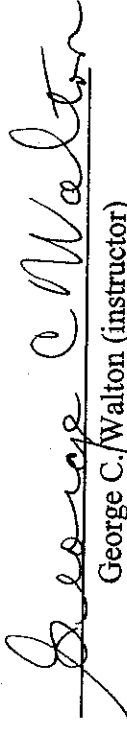
❖ 1025 Executive Blvd., Suite 101 ❖ Chesapeake, VA 23320 ❖ 757-436-1033 ❖

Awards this Certificate of Completion to:

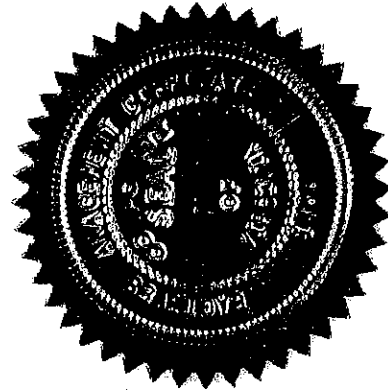
Tim Mullane

for successfully completing an 8-hour Confined Space Entry course
in accordance with Title 29 Code of Federal Regulations Part 1910.146.

Awarded on November 13, 2002.


George C. Walton (instructor)

Certified Hazardous Materials Manager (ML)
Fellow, American Institute of Chemists
Certified Safety Executive, W S O



Certificate No.: 112-64-02.

DEPARTMENT OF PROFESSIONAL AND OCCUPATIONAL REGULATION
COMMONWEALTH OF VIRGINIA

2800 West Broad Street, Richmond, VA 23230
Telephone: 1 (804) 367-3500

EXPIRES ON
06-30-2005

NUMBER
2705 050396A

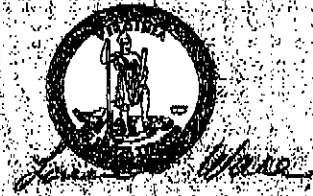
BOARD FOR CONTRACTORS
CLASS A CONTRACTORS LICENSE

A CORPORATION
EC & C
4434 GULLS QUAY

VIRGINIA BEACH VA 23455

CLASSIFICATIONS ASB LAC

ALTERATION OF THIS DOCUMENT, USE AFTER EXPIRATION, OR USE BY PERSONS OR FIRMS OTHER THAN THOSE NAMED MAY RESULT IN CRIMINAL PROSECUTION UNDER THE CODE OF VIRGINIA.



Louise D. Watts, Director

(SEE REVERSE SIDE FOR NAME AND/OR ADDRESS CHANGE)

(DETACH HERE)

(DETACH HERE)

COMMONWEALTH OF VIRGINIA

BOARD FOR CONTRACTORS - CLASS A
CONTRACTOR LICENSE - CLASSIFICATIONS: ASB
LAC

NUMBER: 2705 050396A EXPIRES: 06-30-2005

A CORPORATION

EC & C

4434 GULLS QUAY

VIRGINIA BEACH VA 23455

ALTERATION OF THIS DOCUMENT, USE AFTER EXPIRATION, OR USE BY PERSONS OR FIRMS OTHER THAN THOSE NAMED MAY RESULT IN CRIMINAL PROSECUTION UNDER THE CODE OF VIRGINIA.



DEPARTMENT OF PROFESSIONAL AND OCCUPATIONAL REGULATION
COMMONWEALTH OF VIRGINIA

2800 West Broad Street, Richmond, VA 23230
Telephone: 1 (804) 367-3500

EXPIRES ON
05-31-2005

NUMBER
3306 000883

VIRGINIA ASBESTOS LICENSE
CONTRACTOR LICENSE

THE A CORPORATION
EC & C
4434 GULLS QUAY

VIRGINIA BEACH, VA 23455



Louise F. Watts, Director

(SEE REVERSE SIDE FOR NAME AND/OR ADDRESS CHANGE)

(DETACH HERE)

(DETACH HERE)

COMMONWEALTH OF VIRGINIA

VIRGINIA ASBESTOS LICENSE
CONTRACTOR LICENSE

NUMBER: 3306 000883 EXPIRES: 05-31-2005

THE A CORPORATION

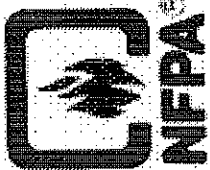
EC & C

4434 GULLS QUAY

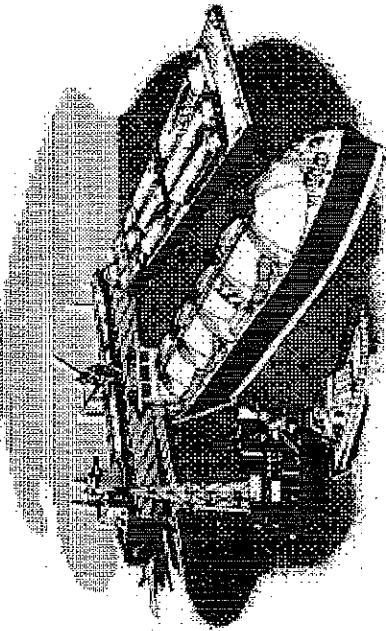


ALTERATION OF THIS DOCUMENT, USE AFTER EXPIRATION, OR USE BY PERSONS OR FIRMS OTHER THAN THOSE NAMED MAY RESULT IN CRIMINAL PROSECUTION UNDER THE CODE OF VIRGINIA.

DEPARTMENT OF PROFESSIONAL AND OCCUPATIONAL REGULATION
2800 West Broad Street, Richmond, Virginia 23230



NATIONAL FIRE PROTECTION ASSOCIATION



This is to certify that

JOHN G. WALKER

IS A CERTIFICATED

MARINE CHEMIST

in accordance with

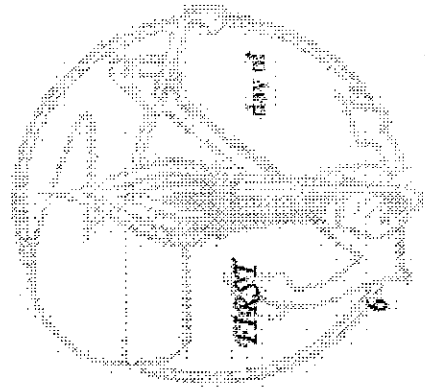
The Rules for The Certification and Recertification of Marine Chemists established by the NFPA.

This Certificate is valid for five(5) years from the

Certificate No.

628

Issue No.



FIRST

day of

OCTOBER, 2004

John G. Walker
President, NFPA

Certificate of Training

URS Corporation

presented to

Ed Dullaghan

for successful completion of the

HAZARDOUS MATERIAL/DANGEROUS GOODS TRANSPORTATION COURSE AND SECURITY AWARENESS TRAINING

to fulfill Department of Transportation, International Civil Aviation
Organization (ICAO), and International Air Transport Association (IATA)
requirements in Raleigh-Durham, NC, on June 14 and 15, 2004.

Andy Romach
Andy Romach
URS Corporation
1600 Perimeter Park Drive
Morrisville, NC 27560
Instructor

Carolyn Norris
Carolyn Norris
URS Corporation
1600 Perimeter Park Drive
Morrisville, NC 27560
Instructor

The management of URS Corporation certifies that
the above-named individual has completed the training
in Hazardous Material Transport and demonstrates
a level of competence needed to fulfill the employee's job
function.

Phillip L. Jones
Phillip L. Jones
Corporate Health and Safety Director
URS Corporation

URS

Health, Safety & Environment

8-Hour Refresher Training

This Certifies That

Edward M Dullaghan

Has completed eight hours of annual refresher training for
hazardous waste/materials workers under OSHA 29 CFR 1910.120



Phillip L. Jones

Phillip L. Jones, M.S., C.I.H.
Vice President - Health, Safety & Environment

12/3/2004

Course Date:

Virginia Beach, VA

Course Location:

04-291

Serial Number:

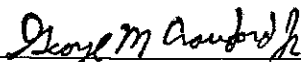
10283

Roy F. Weston, Inc.

I hereby certify that
WESTON  [®]
has completed the
MANAGERS DESIGNERS/CONSULTANTS

**SITE HEALTH AND SAFETY COORDINATORS TRAINING COURSE
MEETS 29 CFR 1910.120 (e) (4)**

**WEST CHESTER, PENNSYLVANIA
OCTOBER 13, 1993**



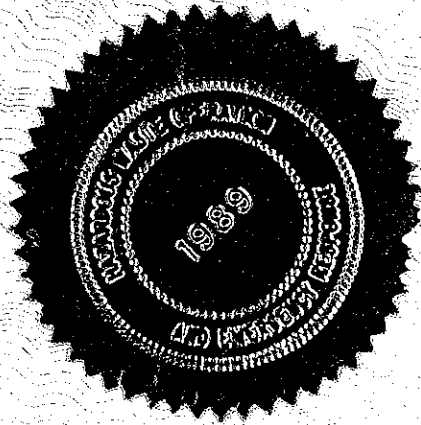
Corporate Health & Safety Director

10/13/93

Date



C E R T I F I C A T E O F A W A R D



This certificate recognizes

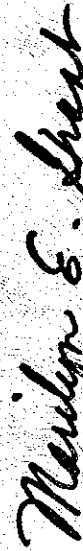
Edward Dullaghan

*as having successfully completed
the 40-hour training course for Hazardous
Waste Activities in compliance with
OSHA 29 CFR 1910.120*


Trainer



**GROUNDWATER
TECHNOLOGY, INC.**



Marilyn E. Grant, Director
Corporate Health & Safety

Appendix C

JRRF Ship Kittiwake Environmental Survey Information

- Jane's ASR Information
- Light Ship Survey
- Asbestos Survey
- Freon Removal Certification and Survey
- PCB Survey 1994
- PCB Sampling and Analysis Report 1997
- Radiological Survey
- Petrochem oil recovery and cleaning letter 1997
- ARS-13 1997 Final Tank Soundings
- Ship Drawings

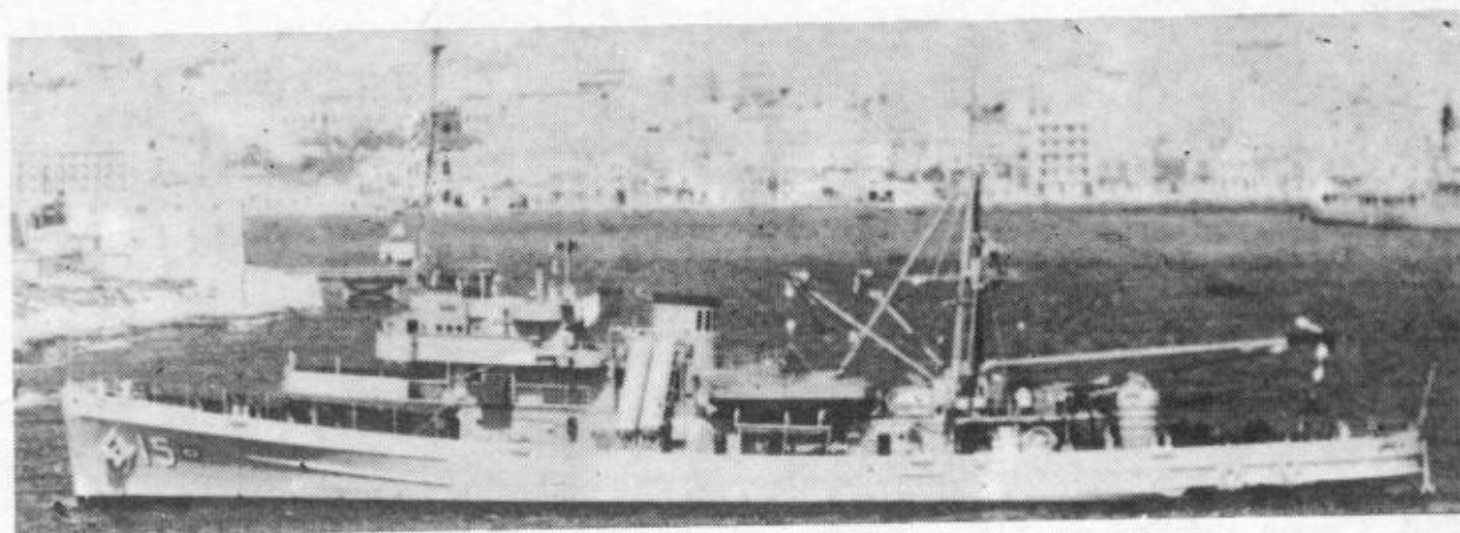
SUBMARINE RESCUE SHIPS (ASR)

8 "Chanticleer" Class

	ASR	Launched		ASR	Launched
CHANTICLEER	7	29 May 1942	KITTIWAKE	13	10 July 1945
COUCAL	8	29 May 1942	PETREL	14	26 Sep 1945
FLORIKAN	9	14 June 1942	SUNBIRD	15	3 Apr 1945
GREENLET	10	12 July 1942	TRINGA	16	25 June 1945
Displacement, tons	1 653 standard; 2 290 full load				
Dimensions, feet	240 wl; 251.5 oa × 42 × 14.9 max				
Main engines	Diesel-electric (Alco in first 4 ships, GM in others).				
	1 shaft; 3 000 bhp = 14.9 knots				
Complement	85				

ASR 7-10 built by Moore SB & DD Co, Oakland, and 13-16 by Savannah Machine & Foundry Co, Launch dates above. All equipped with powerful pumps, heavy air compressors and special submarine rescue chambers. Guns removed 1957-58. Photograph of *Kittiwake* in 1962-63 to 1966-67 editions.

NEW CONSTRUCTION. ASR 21 in FY 1967 Programme. First application of catamaran hull form to major USN ship. 210 wl × 26 (each hull), 86 max × 18.7, 3 200 tons full load, 16 knots, diesels, 6 000 shp, 2—3 inch single guns.



SUNBIRD

1967, A. & J. Pavia

2 "Penguin" Class

PENGUIN	(ex- <i>Chetco</i> , 20 July 1943)	ASR 12
SKYLARK	(ex- <i>Yustaga</i> , 1946)	ASR 20
Displacement, tons	1 235 standard; 1 740 full load	
Dimensions, feet	195 wl; 205 oa × 38.5 × 15.3 max	
Main engines	Diesel-electric; 3 000 bhp = 14 knots	
Complement	85	

Former fleet tugs adapted in 1947. Built by Charleston SB & DD Co, Charleston

National Cargo Bureau, Inc.

Office of the Surveyor
NORFOLK, VA

RECEIVED

MAY 02 2001

James River Reserve Fleet ←

Draft Survey Report
USS "KITTIWAKE," ASR - 13 (USA)

115DS10039

18 April, 2001

Principal:

Department of Transportation
Maritime Administration
MAR - 612 Room 2112
400 7th Street SW
Washington, DC 20590

Order/ Contract No.

DTMA2P01166

This is to certify that the undersigned surveyor of the National Cargo Bureau, Inc. did, at the request of Department of Transportation attend the subject vessel at anchorage in the James River Deactivated Fleet location on 18 April, 2001 for the purpose of ascertaining by measurement calculation the light ship weight of the vessel and has the following to report:

Lightship Calculation: 1,642.84 LT

National Cargo Bureau, Inc. I.D. No. 13-5615188

Attending:

P.W. Phillips

Surveyor for National Cargo Bureau , Inc.

* Note: Soundings of liquids were provided by the James River Reserve Fleet and were not witnessed by the attending surveyor

THIS CERTIFICATE IS NOT A FORM OF INSURANCE, OR GUARANTEE, AND IS ISSUED ON THE FOLLOWING TERMS AND CONDITIONS: This Certificate and performance of services by National Cargo Bureau ("NCB") shall in no way be deemed to be a representation, statement, or warranty of seaworthiness, quality or fitness for a particular use or service, of any vessel, container, cargo, structure, item of material, or equipment. NCB shall not be liable for, and the party to whom this Certificate is issued agrees to indemnify and hold NCB harmless from and against any and all claims, demands, actions for damages, including legal fees, to persons and/or property which may be brought against NCB incidental to, arising out of, or in connection with the services performed hereunder, except for those claims caused solely by the negligence of NCB. NCB shall be discharged from all liability for negligent performance or non-performance of any services in connection with issuance of this Certificate, unless the same is discovered prior to and is claimed in writing made to NCB within 180 days and litigation is commenced within one year after performance of survey services. **THE COMBINED LIABILITY OF NCB, ITS OFFICERS, EMPLOYEES, AGENTS OR SUBCONTRACTORS FOR ANY LOSS, CLAIM, OR DAMAGE ARISING FROM NEGLIGENT PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES IN CONNECTION WITH THE ISSUANCE OF THIS CERTIFICATE, OR FROM BREACH OF ANY IMPLIED OR EXPRESS WARRANTY OF WORKMANLIKE PERFORMANCE, OR ANY OTHER REASON, SHALL NOT EXCEED IN THE AGGREGATE \$10,000. IN NO EVENT SHALL NCB BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES, INCLUDING, BUT WITHOUT LIMITATION, DELAY, DETENTION, LOSS OF USE, OR CUSTOMARY PORT CHARGES TO THE PARTY TO WHOM THIS CERTIFICATE IS ISSUED OR TO ANY OTHER PERSON, CORPORATION OR BUSINESS ENTITY FOR WHOSE BENEFIT THIS CERTIFICATE MAY BE ISSUED.**

Diesel Oil

Tank	T.D. Ft-In	Sounding Ft-In	LT
WT B-902-F	10 - 10	0 - 00	0.0
WT B-901-F	9 - 60	0 - 00	0.0
DB A-4-F	16 - 11	0 - 00	0.1
DB A-3-F	16 - 10	0 - 00	0.0
SR B-201-F	5 - 10	0 - 00	0.0
SR B-202-F	5 - 10	0 - 00	0.0
ST A-902-F	10 - 10	0 - 00	0.0
ST A-903-F	10 - 30	0 - 01	0.1
DB B-903-F	9 - 11	0 - 00	0.0
DB B-904-F	10 - 10	0 - 00	0.0
DB B-905-F	9 - 60	0 - 00	0.0
DB B-906-F	9 - 60	0 - 00	0.0
DB B-907-F	10 - 00	0 - 00	0.0
DB B-908-F	10 - 20	0 - 00	0.0
DB C-405-F	17- 80	0 - 00	0.0
DB C -406-F	18 - 30	0 - 00	0.0
DB C-407-F	19 - 70	0 - 00	0.0
DB C-408-F	18 - 30	0 - 00	0.0
DB C-409-F	20 - 10	0 - 00	0.0
DB C-410-F	26 - 90	0 - 00	0.0
DB C-411-F	19 - 70	0 - 00	0.0
DB C-412-F	26 - 10	0 - 00	0.0
Boiler	Plate Off	Sighted Dry	0.0
Aux Gen	4 - 20	0 - 00	0.1
DB C-901-F	17 - 10	0 - 00	0.0

Totals:**0.3 LT**Lube Oil

Tank	T.D. Ft-In	Sounding Ft-In	LT
HT C-403-L	11 - 20	0 - 00	0.0
HT C-404-L	11 - 10	0 - 00	0.0
ST Settling	Plate Off	Sighted Dry	0.0
CS B-406-L	3 - 70	0 - 05	0.3

Total:**0.3 LT**

Fresh Water

Tank	T.D. Ft-In	Sounding Ft-In	LT
HT A-406-W	-----	Petcocks	0.0
HT A-407-W	-----	Petcocks	0.0
PT A-1-W	29 - 11	0 - 00	0.0
PT C-1-W	16 - 10	3 - 10	4.2
HT EV coll 1	Plate Off	Sighted Dry	0.0
HT EV coll 2	Plate Off	Sighted Dry	0.0
HT Boiler	Plate Off	Sighted Dry	0.0
HT Comp	Plate Off	Sighted Dry	0.0
Total:			4.2 LT

Misc.

Tank	T.D. Ft-In	Sounding Ft-In	LT
CD Void	13 - 00	0 - 00	0.0
CS Chain lkr	Plate Off	Sighted Dry	0.0
CS C-902½-F	17 - 40	0 - 00	0.0
DB CV-902-F	17 - 10	0 - 00	0.0
Total:			0.0 LT

Summary

	LT
Diesel Oil	0.3
Lube Oil	0.3
Fresh Water	4.2
Misc Tanks	0.0

Total Consumables: 4.8 LT

Draft Statement

Start: 18 April, 2001

	Ft - In
Mean Forward Draft	11 - 00
Stem Correction	-----
Corrected Forward Draft	11 - 00
 Draft After Mean	 12 - 04
Stern Correction	-----
Draft Aft Corrected	12 - 04
 Mean Fore and Aft	 11 - 08
 Draft Midships Port	 11 - 10
Draft Midships Stbd	11 - 10
Draft Midships Mean	11 - 10
Midships Correction	-----
Draft Midships Corrected	11 - 10
 Mean of Means	 11 - 09
Draft Corrected for Hog or Sag	11 - 09.5
 Displacement LT @ 1.025	 1678.00 LT
Trim: Start: 1' - 04" (by stern)	
Correction for Trim	(+) 2.63 LT
Corrected Displacement	1680.63 LT
Observed Density Start: 1.000	
Correction for Density	(-) 40.99 LT
Displacement Corrected For Density	1639.64 LT
Total Consumable Stores and Ballast	(-) 4.80 LT
Corrected Displacement	1634.84 LT
 Anchors & Chains	 (+) 8.00 LT
Corrected Displacement Light	1642.84 LT

This report is issued without prejudice and is for the benefit of whom it may concern.

National Cargo Bureau, Inc.

By: 

G. J. Davies - Senior Surveyor

For: P.W. Phillips



GLOBAL ASSOCIATES

P.O. Box 520 • Portsmouth, VA 23705 • Telephone (804) 396-5026

 An OWL Company

GAISMF-97-1285
CKH/khf
28 August, 1997

***Contracting Officers Representative
Inactive Ship Maintenance Facility (NNSY)
Portsmouth, Virginia 23709-5000***

***Subj: POST-STRIPPING ASBESTOS SURVEY ONBOARD THE EX-KITTIWAKE
(ASR-13)***

***Ref: (a) SC NO. B119-97 TDL NO. T0002; Amendment NO. 000
(b) NAVSEADETPORTSVAINST P5090.1
(c) Asbestos Survey On Board The USS KITTIWAKE (ASR-31) of 9 Nov 1994***

Encl: (1) Asbestos Survey Form

Per reference (a) and in accordance with reference (b), a Post-stripping Asbestos Survey was conducted on board the ex-KITTIWAKE (ASR-13) on 12 August 1997.

Possible friable asbestos areas identified have been sealed. Caution and danger signs were replaced as necessary. Enclosure (1) provides specific results of this survey.


W. E. BEALLE
PROJECT MANAGER

Enclosure (5)

ASBESTOS SURVEY FORM

DATE: 13 AUGUST 1997

HULL NO: ASR-13 NUMBER OF SIGNS: 52 MANHOURS: 21 MANHOURS
 NAME: EX-KITTIWAKE CAUTION- 52 LABOR COST: \$
 VESSEL STATUS: CATEGORY DANGER- 0 TRAVEL COST: \$
 CUSTODIAN: NISMF, PORTSMOUTH VA AIR SAMPLES: 7 MATERIAL COST:
 BERTH: PIER ST JULIENS CREEK TOTAL COST:

COMPARTMENT	FRIABLE	NON FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (f/cc)	REMARKS: SAMPLE NUMBER
A-0201-3-M MAGAZINE			X				
A-0201-1-C PILOT HOUSE			X				
A-0201-2-C NAVIGATION		X			1		
A-0101-1-L SR			X				
A-0101-2-L SR			X				
A-0101-4-L SH		X			1		
A-0101-6-C TTY			X				
A-010-3-C RADIO			X				
B-010-1-E BLOWER ROOM		X			1	<.02	7
A-0101-7-Q AC ROOM			X				
A-0101-1-T PASSAGEWAY			X				
A-101-17-C ROOM			X				
A-101-16-C ROOM			X				
A-102-E FAN ROOM			X				

WC: WATER CLOSET
WR: WASHROOM

SH: SHOWER
SR: STATEROOM

STRM: STOREROOM
RM: ROOM

ASBESTOS SURVEY FORM

HULL NO: ASR-13

NAME: EX-KITTIWAKE

COMPARTMENT	VARIABLE	NON - FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (£/cc)	REMARKS: SAMPLE NUMBER
A-101-2 ROOM			X				
A-101-1-E REEL ROOM		X			1		
A-101-3-T PASSAGEWAY			X				
A-101-3-L SH			X				
A-101-4-L WARDROOM		X			2		
A-101-6-L WR GALLEY		X			1		
A-101-5-L GALLEY MESS DECK		X			4	.08 <.02	3 RE- CHECK 8-22-97
B-203-E UPTAKE		X			1		
A-101-11-E LAUNDRY		X			1		
A-101-5-L SH			X				
A-101-14-E SHOP		X			1		
A-101-13-A LOCKER			X				
A-101-15-ET COMPRESSOR ROOM			X				
A-101-16-E CONTROLLER ROOM			X				
A-101-16-T TRUNK			X				

WC: WATER CLOSET
WR: WASHROOMSH: SHOWER
SR: STATEROOMSTRM: STOREROOM
RM: ROOM

ASBESTOS SURVEY FORM

HULL NO: ASR-13NAME: EX-KITTINAKE

COMPARTMENT	FRIABLE	NON - FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (£/cc)	REMARKS: SAMPLE NUMBER
A-101-17-T TRUNK		X			1		
A-202-L PASSAGEWAY			X				
A-305-C SONAR			X				
A-202-L SR 203		X			1		
A-403-A STRM			X				
A-202-L S/R 201		X			1		
A-202-L S/R 202			X				
A-202-L S/R 204			X				
A-203-2-L PASSAGEWAY		X			2		
A-202-T TRUNK		X			1	<.02	4
A-402-A STRM		X			1		
A-304-E REEFER		X			1		
A-304-4-A PASSAGEWAY		X			1		
A-304-2-A FREEZER			X				
A-304-3-A FREEZER			X				
A-304-4-A FREEZER			X				

WC: WATER CLOSET

SH: SHOWER

STRM: STOREROOM

WR: WASHROOM

SR: STATEROOM

RM: ROOM

ASBESTOS SURVEY FORM

HULL NO: ASR-13NAME: EX-KITTIWAKE

COMPARTMENT	FRIABLE	NON - FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (f/cc)	REMARKS: SAMPLE NUMBER
A-203-1-A SICK BAY		X			1		
A-203-2-L OFFICE		X			1		
A-203-2-L CPO MESS		X			1		
A-306-T TRUNK		X			2		
A-405-A STRM			X				
A-306-A STRM		X			1		
A-306-A ORD STORES		X			1		
A-306-E GYRO			X				
A-306-A OFFICE		X			1		
A-306-A SHOP		X			1		
A-306-A BARBER SHOP		X			1		
A-306-A OFFICE			X				
A-410-M-T TRUNK			X				
A-408-M MAGAZINE			X				
A-404-M MAGAZINE			X				
A-409-M MAGAZINE			X				

WC: WATER CLOSET
WR: WASHROOMSH: SHOWER
SR: STATEROOMSTRM: STOREROOM
RM: ROOM

ASBESTOS SURVEY FORM

HULL NO: ASR-13NAME: EX-KITTIWAKE

COMPARTMENT	FRIABLE	NON - FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (f/cc)	REMARKS: SAMPLE NUMBER
A-101-18 TRUNK		X			1	<.02	5
A-204-A-E COMPRESSOR ROOM		X			1		
A-2-E COMPRESSOR ROOM		X			1		
A-3-E CHT ROOM			X				
A-101-5-T TRUNK			X				
B-203-E ENGINE ROOM		X			2	.13 <.02	2 RE-CHECK 8-22
A-101-10-T TRUNK			X				
A-101-15-R TRUNK			X				
B-204-E ENGINE ROOM		X			2		
A-101-12-T TRUNK			X				
A-101-17-T TRUNK		X			1		
C-201-L BERTH		X			2		
C-401-A STRM		X			2		
C-202-L BERTH			X				
C-203-L LOUNGE		X			1		
C-203-A STRM		X			1		

WC: WATER CLOSET
WR: WASHROOMSH: SHOWER
SR: STATEROOMSTRM: STOREROOM
RM: ROOM

ASBESTOS SURVEY FORM

HULL NO: ASR-13NAME: EX-KITTINAKE

COMPARTMENT	FRIABLE	NON - FRIABLE	N/A	NUMBER DANGER SIGNS	NUMBER CAUTION SIGNS	SAMPLE READINGS (f/cc)	REMARKS: SAMPLE NUMBER
C-203-A ROOM		X			1		
C-203-A LOCKER			X				
C-203-A BERTH			X				
C-203-A OFFICE			X				
C-204-A STRM		X			1		
C-402-AE SHAFT ALLEY		X			1	<.02	6
C-205-E AFT STEERING			X				
C-401-A STRM			X				
C-302-A PAINT LOCKER			X				
A-303-A STRM			X				
A-201-E ANCHOR WINDLASS		X			1	<.02	1
A-301-E CHAIN LOCKER			X				

WC: WATER CLOSET
WR: WASHROOMSH: SHOWER
SR: STATEROOMSTRM: STOREROOM
RM: ROOM



DEPARTMENT OF THE NAVY

USS KITTIWAKE (ASR-13)

FPO AE 09576-3208

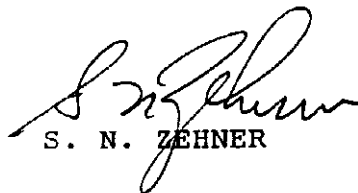
5000
SER ASR13/
22 SEP 94

From: Commanding Officer, USS KITTIWAKE (ASR-13)
To: Director, Naval Sea Systems Command Detachment, Naval
Inactive Ship Maintenance Facility, Portsmouth, VA

Subj: REMOVAL OF REFRIGERANTS

Ref: (a) USS KITTIWAKE (ASR-13) Standard Inactivation Plan

1. In accordance with reference (a), all refrigerants were removed from the ship on 23 August 1994. Enclosure (1) is provided for verification.


S. N. ZEHNER

Enclosure (7)



DEPARTMENT OF THE NAVY
SHORE INTERMEDIATE MAINTENANCE ACTIVITY
9170 SECOND ST STE 100
NORFOLK, VA 23511-2392

4770
Ser 03/R0577
23 August 1994

From: Commanding Officer, Shore Intermediate Maintenance
Activity, Norfolk
To: Commanding Officer, USS KITTYWAKE (ASR 13)
Subj: REFRIGERANT RECOVERY FROM USS KITTYWAKE (ASR 13)
Ref: (a) NAVSEA ltr 4770 N31: SRB: scb Ser: 111 of 16 FEB 94
(b) NAVSEA ltr 4770 OPR: PMS335D13 Ser: PMS335/2431 of
29 Jul 93

1. Per references (a) and (b), Shore Intermediate Maintenance Activity (SIMA), Norfolk AC&R Shop (56B) recovered the following: 71 lbs. of R-12 from NR 1,2 ships refrigeration plants IAW JCN 04712EA011948.

2. Shop personnel ensured that all plants were drawn into a vacuum to ensure all refrigerant was recovered from each refrigeration plant and a nitrogen blanket was added.


D. L. MISTLER
By direction

USS KITTIWAKE (ASR-13)
FREON PACKAGE UNITS

<u>TYPE</u>	<u>LOCATION</u>	<u>QUANTITY</u>
SALAD BAR	A-101-5L MESS DECK	1
REEFER	A-101-5L MESS DECK	1
REEFER	A-203-1A SICK BAY	1
REEFER	A-203-2L CPO BERTHING	1
DRINKING FOUNTAIN	A-203-2L PASSAGEWAY	1
PACKAGE A/C UNIT	A-202-L 1ST LST S/R	1
PACKAGE A/C UNIT	A-306-A 3M OFFICE	1
DRINKING FOUNTAIN	A-204-AE AIR STOWAGE RM	1
DRINKING FOUNTAIN	B-203-E AUX MACH RM	1
DRINKING FOUNTAIN	B-204-E MOTOR RM	1
PACKAGE A/C UNIT	C-201-L BERTHING	1
DRINKING FOUNTAIN	C-202-L BERTHING	1
PACKAGE A/C UNIT	C-203-L LOUNGE	1
REEFER	C-203-T PASSAGEWAY	1



GLOBAL ASSOCIATES

P.O. Box 520 • Portsmouth, VA 23705 • Telephone (804) 396-5026

An OWL Company

GAISMF-95-0090
EMD/ojm
24 October 1994

CONTRACTING OFFICERS REPRESENTATIVE
INACTIVE SHIP MAINTENANCE FACILITY (NNSY)
PORTSMOUTH, VIRGINIA 23709-5000

Subj: POLYCHLORINATED BIPHENYL (PCB) SURVEY ON BOARD THE
KITTIWAKE (ASR-13)

Ref: (a) SC NO. B119-95; TDL NO. T001; Amendment NO. 000 (1)
(b) NAVSEADETPORTSVAINST P5090.1
(c) NAVSEADETPORTSVA Ltr 5090 07A61B:SRT:dpn Ser of
02 Apr 90

Encl: (1) PCB Survey Form
(2) Shipboard PCB Inventory

Per reference (a) and in accordance with reference (b), a PCB
Survey was conducted on board the KITTIWAKE (ASR-13)
on 20 October 1994, using reference (c) as a guide.

Enclosures (1) and (2) provide specific survey information.


C. K. HILL
PROJECT MANAGER

Enclosure (6)

PCB SURVEY FORM

VESSEL NAME:	<u>KITTIWAKE</u>
VESSEL HULL NUMBER:	<u>ASR-13</u>
DATE OF SURVEY:	<u>10-20-94</u>
NUMBER PCB SIGNS:	<u>13</u>
VESSEL STATUS:	<u>"C"</u>
CUSTODIAN:	<u>NISMF PORTSMOUTH VA</u>
BERTHING LOCATION:	<u>ST JULIENS CREEK</u>
PCB SURVEY (M/H):	<u>7</u>
LABOR COST:	<u> </u>
TRAVEL COST:	<u>0</u>
MATERIAL COST:	<u>0</u>
TOTAL COST:	<u> </u>

HULL NUMBER: ASR-13SHIPBOARD PCB INVENTORY
DATE: 20 October 1994PAGE 1 OF 1
NAME: KITTYWAKE

SPACE LOCATION	GLOBAL IDENT NUMBER	EQUIPMENT NOUN NAME	APL NUMBER	* TYPE K/T/C/O	STATUS I O	REMOVED FROM SERVICE	** PCB QTY	OFFLOAD DESTINATION/ DATE
BRIDGE	ASR-13 001	BPA-25 E INDICATOR	56982560	K				
PILOT HOUSE 02-46-2	ASR-13 002	BOUNDINGS SET SONAR UQN-1	83416605	K				
MOTOR RM	ASR-13	SHIPBOARD ALARM						
B-204-E	003	SWITCHBOARD 20 CKT	229990003	K				
MOTOR RM B-204-E	ASR-13 004	AIR FILTER ELCTBTC	AIR 48079003G	O				
NAV A-0201-2C	ASR-13 005 & 006	AN/BQS-52 (AN/BQS-4) SONAR	57093550	K				
BRIDGE	ASR-13 007	AN/BQS-52 (AN/BQS-4) SONAR	57093550	K				
SONAR RM A-305-C	ASR-13 008 - 013	AN/BQS-52 (AN/BQS-4) SONAR	57093550	K				

* K - CAPACITORS T - TRANSFORMERS C - CONTAINERS O - OTHERS (FILTERS, ETC)
**NOTE: THE NUMBER ENTERED HERE INDICATES THE NUMBER OF ITEMS IN THAT SPACE WITH THAT APL
NUMBER. THE QUANTITY OF PCB FLUID HAS NOT BEEN DETERMINED AND TESTING HAS NOT BEEN
PERFORMED. ITEMS IDENTIFIED SHOWED NO SIGNS OF LEAKAGE.

FOR OFFICIAL USE ONLY
REPORTS MAY BE DUPLICATED,
BUT ONLY IN THEIR ENTIRETY.

PAGE 1 OF 3
REPORT NUMBER

97NN02674

AUG. 18 1997

LABORATORY DIVISION
NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VA. 23709-5000

Customer's Ref. No.: EX-KITTIWAKE ASR-13
Submitted by: GLEN CLARK
Shop/Code : PMS 335D1
Phone : 703-602-5670

Program Code : TSCA
Job Order Number: 4778913058
Sample Received: 970609
Sample Source: NISMF PORTSMOUTH, VA

ENVIRONMENTAL PCB TEST REPORT:

DESCRIPTION: PCB: SOLIDS / WIPES / OILS

SAMPLE	SAMPLE LOCATION / ID.	TEST	RESULT	UNITS	AROCOR TYPE (#)
001	A-0201-1C, 1"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	< 50	ug/g	ND
002	A-0201-1C, 1/2"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	48	ug/g	1254
003	01-49-1, 3/4"GRYCB, ARMRSOLD, NO DATE	PCBSOLID	17	ug/g	1254
004	01-49-1, 3/4"GRYCB, ANACONDA/CONT, 1978	PCBSOLID	43	ug/g	1254
005	01-46-2, 1 1/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	1500	ug/g	1254
006	1-44-1, 3/4"GRYCB, PLASTOID, 1975	PCBSOLID	49	ug/g	1254
007	STRM203, 1/2"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	58	ug/g	1254
008	A202LPWY, 3/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	240	ug/g	1254
009	A202LPWY, 5/8"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	10	ug/g	1254, 1262
010	A202LPWY, 1"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	15	ug/g	1254, 1262
011	A202LPWY, TOOL CHECK	PCBSW	< 10	ug/100 cm2	ND
012	Z-26-2, 1 1/4"GRYCB, ARMRSOLD, NO DATE	PCBSOLID	< 5	ug/g	ND
013	A-304-2-A, 3/8"GRYCB, GENERAL, 1974	PCBSOLID	< 50	ug/g	ND
014	A-304-TPWY, 3/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	< 50	ug/g	ND
015	B203EENGRM, 2"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	850	ug/g	1254
016	B203EENGRM, 3/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	91000	ug/g	1262
017	B203EER, 1 1/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	32400	ug/g	1260
018	B203EENGRM, 3/4"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	10	ug/g	1262
019	B204EENGRM, 3/8"GRYCB, COLLYER, 1982	PCBSOLID	< 5	ug/g	ND
020	B204EFWPMP, 1/2"BLKCB, ARMRSOLD, NO DATE	PCBSOLID	35	ug/g	1262

Remarks:

(#) AROCLOR REPORTED WAS THE MAJOR PCB GROUP(S) DETECTED AND DOES NOT CONSTITUTE ALL COMMERCIAL GRADES.
ND = NONE DETECTED. CODE 134.12 PROCEDURE#: 134.12-96-254

** Reviewer (signature) *334-42684* Date: *8/19/97* | Released (signature) *Marlin A. McCreckin* Date: *8/19/97* | Code : 134.12
Spence M. Ward | Phone 6-3029

** The person designated to sign for an action verifies, based on personal observation, certified records, or direct report from watchstanders, and certifies by his signature that the action has been performed in accordance with the specified requirements. Note: Report relates only to ITEMS tested.

Distribution:

Enclosure (10)

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PAGE 2 OF 3
REPORT NUMBER

97NN02674

AUG. 18 1997

LABORATORY DIVISION
NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VA. 23709-5000

Customer's Ref. No.: EX-KITTIWAKE ASR-13
Submitted by: GLEN CLARK
Shop/Code : PMS 33501
Phone : 703-602-5670

Program Code : TSCA
Job Order Number: 4778913058
Sample Received: 970609
Sample Source: NISMF PORTSMOUTH, VA

ENVIRONMENTAL PCB TEST REPORT:

DESCRIPTION: PCB: SOLIDS / WIPES / OILS

SAMPLE	SAMPLE LOCATION / ID.	TEST	RESULT	UNITS	AROCOR TYPE (#)
021	2-111-2PWY, 5/8"BLKCB, ARMSTRONG, NO DATE	PCBSOLID	8	ug/g	1262
022	2-111-2PWY, TOOL CHECK	PCBSW	< 10	ug/100 cm2	ND
023	1-38-3PWY, BULKHEAD INSULATION	PCBSOLID	37	ug/g	1254
024	2-44-1GNLOFF, BULKHEAD INSULATION	PCBSOLID	< 5	ug/g	ND
025	CREWMESSEK, BULKHEAD INSULATION	PCBSOLID	< 10	ug/g	ND
026	A-101-5-LHD, BULKHEAD INSULATION	PCBSOLID	< 25	ug/g	ND
027	2-107-3STOR, BULKHEAD INSULATION	PCBSOLID	< 5	ug/g	ND
028	2-104-2LGRM, BULKHEAD INSULATION	PCBSOLID	28	ug/g	1254, 1262
029	A0101-5CRAD, BLK RBBR SHOCK MOUNT	PCBSOLID	113	ug/g	1254
030	A0101-6CSEC, BLK ELECTRICAL CHANNEL RBBR	PCBSOLID	108	ug/g	1254
031	A0101-6CSEC, FIELD BLANK	PCBSOLID	< 10	ug/g	ND
032	A-2EADIV, BLK RBBR PIPE HANGER	PCBSOLID	< 10	ug/g	ND
033	A-101-14E, BLK ELECTRICAL CHANNEL RBBR	PCBSOLID	< 10	ug/g	ND
034	A-101-14E, TOOL CHECK	PCBSW	< 10	ug/100 cm2	ND
035	B203EENGRM, BLK RBBR PIPE HANGER	PCBSOLID	< 20	ug/g	ND
036	B203EENGRM, ALUM.PT./#2 BOILER FRONT	PCBSOLID	< 20	ug/g	ND
037	B203EENGRM, ALUM.PT./#1 BOILER FRONT	PCBSOLID	< 5	ug/g	ND
038	A-101-15ET, ALUM.PT./#1 DECOMPRESK PIPE	PCBSOLID	< 50	ug/g	ND
039	A-101-15ET, DOUBLE-BACKED TAPE	PCBSOLID	< 40	ug/g	ND
040	GALLEY, DOUBLE-BACKED TAPE	PCBSOLID	< 5	ug/g	ND

Remarks:

(#) AROCLOR REPORTED WAS THE MAJOR PCB GROUP(S) DETECTED AND DOES NOT CONSTITUTE ALL COMMERCIAL GRADES.
ND = NONE DETECTED. CODE 134.12 PROCEDURE#: 134.12-96-254

** Reviewer (signature) *James M. Ward* Date: *8/19/97* Released (signature) *Mathew A. McCracken* Date: *8/19/97* Code : 134.12
Phone 6-3029

* The person designated to sign for an action verifies, based on personal observation, certified records, or direct report from watchstanders, and certifies by his signature that the action has been performed in accordance with the specified requirements. Note: Report relates only to ITEMS tested.

Distribution:

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PAGE 3 OF 3
REPORT NUMBER

97NN02674

AUG. 18 1997

LABORATORY DIVISION
NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VA. 23709-5000

Customer's Ref. No.: EX-KITTIWAKE ASR-13
Submitted by: GLEN CLARK
Shop/Code : PMS 335D1
Phone : 703-602-5670

Program Code : TSCA
Job Order Number: 4778913058
Sample Received: 970609
Sample Source: NISMF PORTSMOUTH, VA

ENVIRONMENTAL PCB TEST REPORT:

DESCRIPTION: PCB: SOLIDS / WIPES / OILS

SAMPLE	SAMPLE LOCATION / ID.	TEST	RESULT	UNITS	AROCLOR TYPE (#)
041	CPOBERTH, DOUBLE-BACKED TAPE	PCBSOLID	< 5	ug/g	NO
042	4-203-2L, DOUBLE-BACKED TAPE	PCBSOLID	< 5	ug/g	NO
043	4-203-2-L, RED RBBR GASKET	PCBSOLID	< 10	ug/g	NO
044	A-203-2L, BLK RBBR GASKET	PCBSOLID	37	ug/g	1254,1262
045	A-203-2L, TOOL CHECK	PCBSW	< 10	ug/100 cm2	NO
046	A-101-14E, RED RBBR GASKET	PCBSOLID	< 5	ug/g	NO
047	A-0101-3C, BLK RBBR GASKET	PCBSOLID	27	ug/g	1268
048	B203EENGRM, BLK RBBR GASKET	PCBSOLID	< 25	ug/g	NO
049	C204AFTSTG, BLK RBBR GASKET	PCBSOLID	67	ug/g	1254,1262
050	1-59-2PORT, BLK RBBR GASKET	PCBSOLID	< 5	ug/g	NO
051	C204AFTSTG, OIL/HYDRAULIC STEERING OIL	PCBOIL	< 10	ug/g	NO
052	C204AFTSTG, GREASE/RUDDER POST	PCBOIL	< 10	ug/g	NO
053	TOPSDAFTSBD, GREASE/MAINBOOM TOPPING UNCH	PCBOIL	< 1	ug/g	NO

Remarks:

(#) AROCLOR REPORTED WAS THE MAJOR PCB GROUP(S) DETECTED AND DOES NOT CONSTITUTE ALL COMMERCIAL GRADES.
NO = NONE DETECTED. CODE 134.12 PROCEDURE#: 134.12-96-254

** Reviewer (signature) Spence M. Ward Date: 8/19/97 Released (signature) Malcolm A. McCloud Date: 8/19/97 Code : 134.12
Phone 6-3029

** The person designated to sign for an action verifies, based on personal observation, certified records, or direct report from watchstanders, and certifies by his signature that the action has been performed in accordance with the specified requirements. Note: Report relates only to ITEMS tested.

Distribution:

ENVIRONMENTAL CHEMISTRY LABORATORY ANALYSIS REQUEST FORM

I ADMINISTRATIVE INFORMATION

Priority 1 2 (3) (Circle One) Request Completion Date: 30 DAYS AFTER REC. Lab Rpt # 97NW02674

Requestor: SHARON THOMPSON Code: AJ32 Date: _____ Phone/Fax: (757) 485-6381 Ref #: _____

Program Manager: GLEN CLARK PMS 335D1 Phone: (703) 602-5670 J.O.# 476K113046

Priority Approved by: _____ This is a RESAMPLE of reference #: _____ Program Codes: TSCA

Additional sample information and intended data use: _____

II. ANALYSIS REQUEST

ORGANICS	RCRA	WET CHEMISTRY	IC	GRAPHITE AA	ICP METALS	OTHER
TOC	FLASH PT	pH	NITRATE M	ARSENIC		
TOX	CORROSIVITY	COND	NITRITE M	SILVER		
TX	TOZD	SP GRAY	CHLORIDE	LEAD		
ORGANIC		COO	FLUORIDE			
SCREEN	TCLP	TSS	PHOSPHATE	COLD VAPOR		
VOL ORG	METALS	TDS	SULFATE	MERCURY		
SEMI ORG	ORGANICS	ACIDITY				
ALCOHOL		ALKALINITY	METALS	ICP METALS	BACTERIOLOGY	
TPH	WET CHEMISTRY	MBAS	DIGESTION	ARSENIC	T COLI	
PCB	AMMONIA N	OIL/GREASE	HRSO	CADMIUM	F COLI	
SWIPE	PHOSPHATE	CHROME 6	NPDES	CHROME	F STREP	
SOLID	TOTAL	AGGRESSIVITY	CRANEY	COPPER	RES CL	
OIL	PHOSPHOROUS		OTHER	IRON	NPC	
WATER	TOTAL			LEAD	OTHER	
	CYANIDE			NICKEL		
	PHENOL			SILVER		
			(CHECK METALS)	ZINC		

SPECIAL ANALYSIS AND INSTRUCTIONS:

III FIELD INFORMATION

Sample Source/Ship: EX-KITTIWAKE ASR-13

Location: ST. JULIENS CREEK, PORTSMOUTH, VA

Grab ☒ Thief _____ Comp A _____ Other comp _____

PIN # (RCRA only) _____ pH _____ Temp _____ °C

Sample Description: PCBS IN SWIPES, SOLIDS, OILS

IV CHAIN OF CUSTODY Collected by R. BROWN

Date 6-6-97 Time 1439 Code 202 Phone 396-3350

Relinquished by R. BROWN

Received by P. J. KELLEY Date 6/9/97

Time 1319 Code 134.12 Phone 396-3029

Relinquished by _____

Received by _____ Date _____

Time _____ Code _____ Phone _____

Relinquished by _____

Received by _____ Date _____

Time _____ Code _____ Phone _____

Multiple Sample Record Total number of samples 53

001	013
002	014
003	015
004	016
005	017
006	018
007	019
008	020
009	021
010	022
011	023
012	024

V CODE 106.323 INFORMATION

Will this sample(s) be used to help evaluate a potentially hazardous personnel exposure which has already occurred?

yes ☒ no ☐

Requestor/Supervisor Signature Michael D. Daulton
Date 6-9-97

LAB REPT # 97NN02674

PAGE: 1 OF 8

VESSEL: EX-KITTIWAKEDATE: 6 JUN 97ELECTRICAL CABLE SAMPLING LOGIN SHEET
(20 Samples required)

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION OF CABLE (Size, Color, Manufacturer, MIL-SPEC, etc)	Cable Year
No.	Time			
1	0829	Pilot House A-0201-1C	1" Black Armor Shielded	VNK
2	0832	Pilot House A-0201-1C	1/2" Black Armor Shielded	VNK
3	0837	RADIO Transmitter Rm 01-49-1	3/4" Grey Armor Shielded	VNK
4	0842	RADIO Transmitter Rm 01-49-1	3/4" Grey Anaconda Cont. TTR5-6 STD PVC	1978
5	0847	CAPTAIN'S STRM 01-46-2	1 1/4" Black Armor Shielded	VNK
6	0856	WARD Rm MESS 1-44-1	3/4" Grey Plastoid TTSU 20 STD PVC	1975
7	0910	OFFICERS State Rm 203	1/2" Black Armor Shielded	VNK
8	0916	PWAY A202L	3/4" Black Armor Shielded	VNK
9	0919	PWAY A202L	5/8" Black Armor Shielded	VNK
10	0920	PWAY A202L	1" Black Armor Shielded	VNK

LAB REPT # 97HNO2674

PAGE: 2 OF 8

VESSEL: EX-KITIWAKEDATE: 6 JUN 97ELECTRICAL CABLE SAMPLING LOGIN SHEET
(20 Samples required)

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION OF CABLE (Size, Color, Manufacturer, MIL-SPEC, etc)	Cable Year
No.	Time			
12	0927	CARGO STORE RM 2-26-2	1 1/4" Grey Armor Shielded	UNK
13	0947	Vegetables A-304-2-A Reefter	3/8" Grey General ESGU3 SPL PVC	1974
14	0950	Reefter Deck PWAY A-304-T	3/4" Black Armor Shielded	UNK
15	0956	ENGINE RM STBD WALL B203E	2" Black Armor Shielded	UNK
16	1000	ENGINE RM STBD WALL B203E	3/4" Black Armor Shielded	UNK
17	1005	ENGINE RM STBD WALL B203-E	1 1/4" Black Armor Shielded	UNK
18	1007	ENGINE RM FWD Bulkhead B203E	3/4" Black Armor Shielded	UNK
19	1014	#2 Emergency Gen ENGINE RM B204 E	3/8" Grey Collyer TTSU3 SPL PVC	1982
20	1017	#1 Fresh Water pump controller B204 E	3/8" Black Armor Shielded	UNK
21	1023	PWAY 2-111-2	5/8 Black Armor Shielded	UNK

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VESSEL: EX-KITIWAKEDATE: 6 JUN 97BULKHEAD INSULATION SAMPLING LOGIN SHEET
(6 Samples Required)

Sample		Location (Compartment Name/Number)	DESCRIPTION OF INSULATION (Type, Color, Etc.)
No.	TIME		
23	1032	1-38-3 PWAY	BROWN Fiber GLASS
24	1035	2-44-1 General OFF	Yellow Fiber GLASS
25	1037	crews mess DECK	Yellow Fiber GLASS
26	1039	HEAD A-101-5-L	Yellow Fiber GLASS
27	1042	OXY-HEL-STW6 2-107-3	Yellow Fiber GLASS
28	1045	ENGR LOG RM 2-104-2	Yellow Fiber GLASS

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VESSEL: EX-KITI WAKEDATE: 6 JUN 97RUBBER APPLICATION SAMPLING LOGIN SHEET
(5 Samples Required)

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION (SEE NOTE BELOW)
No.	Time		
29	1235	Radio Room Central A0101-5C	Shock MOUNT Rubber
30	1238	Security TTY RM A0101-6C	ELECTRICAL CHANNEL rubber
32	1250	A-2E A DIV	Pipe Hanger
33	1301	Workshop Ship Fitter A-101-14E	ELECTRICAL Channel rubber
35	1308	ENGINE RM B 203E	Pipe hanger

Rubber applications include but are not limited to:

Isolation shock mounts for electronic equipment

Pipe hangar lines

Electrical channel rubber

Foundation mounts

Pipe Block hangers

NOT VENTILATION GASKETS

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PAGE: 5 OF 8

VESSEL: EX-KITLINAKDATE: 6 JUN 97ALUMINIZED PAINT SAMPLING LOGIN SHEET
(3 Samples Required)

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION OF EQUIPMENT WHERE RETRIEVED
No.	Time		
36	1311	ENG. RM B 203 E	#2 Boiler Front
37	1316	ENG. RM B 203 E	#1 Boiler Front
38	1324	Recompression TANK RM A-101-15ET	#1 Decompression TANK Piping

DOUBLE-BACKED ADHESIVE TAPE SAMPLING LOGIN SHEET
(4 Samples Required)

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION OF EQUIPMENT (Where Retrieved and color)
No.	Time		
39	1327	Recompression RM A-101-15ET	1/2" Black Double Back Tape CCOL
40	1330	Galley	1" White Double Back Tape CCOL
41	1334	PWAY CPO Berthing	2" Black Double Back Tape CCOL
42	1338	4-203-2L CPO Berthing	1/2" White Double Back Tape CCOL

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PAGE: 6 OF 8

VESSEL: EX-KITTIWAKEDATE: 6 JUN 97VENTILATION GASKET SAMPLING LOGIN SHEET
10 Samples Required

Sample		LOCATION (Compartment Name/Number)	DESCRIPTION OF VENTILATION GASKET (Rubber/Wool Felt, etc)
No.	Time		
43	1341	4-203-2L CPD Berthing	Red Rubber
44	1346	PWA4 A-203-2L	Black Rubber
46	1353	Ship Attender stop A-101-14E	RED Rubber
47	1356	RADIO ROOM A-0101-3C	Black Rubber
48	1402	ENG. ROOM B203E	Black Rubber
49	1416	C204A AFT steering	Black Rubber
50	1420	PORT SIDE 1-59-2	Black Rubber

VESSEL: EX-KITTWAKE

DATE: 6 JUN 97

OIL SAMPLING LOGIN SHEET
(8 Samples of Oil and 2 Samples of Grease Required)

- 11

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PAGE: 8 OF 8

VESSEL: EX-KITT WAKE

DATE: 6 JUN 97

FIELD BLANKS SAMPLING LOGIN SHEET
(2 Samples required: One after every 30 Samples)

SAMPLE		LOCATION (COMPT NAME AND NUMBER)	DESCRIPTION (TYPE, COLOR, APPLICATION, ETC)
NO	TIME		
FB-1 31	1240	Security TTY RM A-DID-6C	
FB-1			

TOOL BLANKS SAMPLING LOGIN SHEET
(6 Samples required; One after every 10 Samples)

SAMPLE		LOCATION (COMPT NAME AND NUMBER)	DESCRIPTION (TYPE, COLOR, APPLICATION, ETC)
NO	TIME		
TB-1 11	0923	PWAY A202L	
TB-2 22	1025	PWAY 2-111-2	
TB-3 34	1304	Ship Fitter Shop A-101-14E	
TB-4 45	1348	PWAY A203-2L	
TB-5			
TB-6			

91NN02674

Date: 6 JUNE 97

ADDENDUM TO

POLYCHLORINATED BIPHENYL SAMPLING AND ANALYSIS REPORT
of _____

Subj: PCB SAMPLING AND ANALYSIS SURVEY FOR EX-KITLWAKE

Ref: (a) COMNAVSEASYS COM WASHINGTON DC Ltr 4770 Ser 00T/248 of
21 Sep 95 (Subj: NAVSEA PCB Advisory 95-1)

1. The following statement is provided regarding the number of samples taken as required by reference (a):

<u>20</u>	SAMPLES OF ELECTRICAL CABLE WERE TAKEN.
<u>7</u>	SAMPLES OF VENTILATION DUCT GASKETS WERE TAKEN.
<u>6</u>	SAMPLES OF BULKHEAD INSULATION WERE TAKEN.
<u>3</u>	SAMPLES OF OILS AND GREASES WERE TAKEN.
<u>4</u>	SAMPLES OF DOUBLE-BACKED ADHESIVE TAPE WERE TAKEN.
<u>3</u>	SAMPLES OF ALUMINIZED PAINT WERE TAKEN.
<u>5</u>	SAMPLES OF RUBBER APPLICATIONS (I.E., SHOCK MOUNTS, HATCH GASKETS, PIPE HANGARS, ETC.) WERE TAKEN.
<u>5</u>	QUALITY CONTROL SAMPLES (FIELD AND TOOL BLANKS) WERE TAKEN.

2. A representative sample was taken of each of the applications identified above. No other applications meeting the criteria of reference (a) were available for sampling on board.

SAMPLER(S)



SAMPLER(S)

PCB Sampling Data by Major Arochlor Group (ug/g)
KITTIWAKE - Liquid PCBs Aboard

Description - CABLE	1221	1232	1242	1248	1254	1260	1262	1268	Total
Black, 5/8", Armorshield							8		8
Black, 5/8", Armorshield					5		5		10
Black, 3/4", Armorshield							10		10
Black, 1", Armorshield					7.5		7.5		15
Gray, 3/4", Armorshield					17				17
Black, 1/2", Armorshield							35		35
Gray, 3/4", Anaconda/Cont, 1978					43				43
Black, 1/2", Armorshield					48				48
Gray, 3/4", Plastoid, 1975					49				49
Black, 1/2", Armorshield					58				58
Black, 3/4", Armorshield					240				240
Black, 2", Armorshield					850				850
Black, 1-1/4", Armorshield					1500				1500
Black, 1-1/4", Armorshield						32400			32400
Black, 3/4", Armorshield							91000		91000
Gray, 1-1/4", Armorshield									<5 ND
Gray, 3/8", Collyer, 1982									<5 ND
Black, 1", Armorshield									<50 ND
Gray, 3/8", General, 1974									<50 ND
Black, 3/4", Armorshield									<50 ND
Vent Gasket ..	1221	1232	1242	1248	1254	1260	1262	1268	Total
Black rubber gasket								27	27
Black rubber gasket					18.5		18.5		37
Black rubber gasket					33.5		33.5		67
Red rubber gasket									<10 ND
Black rubber gasket									<25 ND
Red rubber gasket									<5 ND
Black rubber gasket									<5 ND
Insulation	1221	1232	1242	1248	1254	1260	1262	1268	Total
Yellow fiberglass					14		14		28
Brown fiberglass					37				37
Yellow fiberglass									<10 ND
Yellow fiberglass									<25 ND
Yellow fiberglass									<5 ND
Yellow fiberglass									<5 ND
Rubber Applications	1221	1232	1242	1248	1254	1260	1262	1268	Total
Black electrical channel rubber					108				108
Black rubber shock mount					113				113
Black rubber pipe hanger									<10 ND
Black electrical channel rubber									<10 ND
Black rubber pipe hanger									<20 ND
Tape/Adhesives	1221	1232	1242	1248	1254	1260	1262	1268	Total
Black double backed tape 1/2"									<40 ND
White double backed tape 1"									<5 ND
Black double backed tape 2"									<5 ND
White double backed tape 1/2"									<5 ND
Oils/Greases	1221	1232	1242	1248	1254	1260	1262	1268	Total
Grease, topping winch									<1 ND
Hydraulic, steering gear									<10 ND
Grease, rudder post									<10 ND
Paint	1221	1232	1242	1248	1254	1260	1262	1268	Total
#2 Boiler front									<20 ND
#1 Boiler front									<5 ND
#1 Decompression tank piping									<50 ND



GLOBAL ASSOCIATES

P.O. Box 520 • Portsmouth, VA 23705 • Telephone (804) 396-5026

An OWL Company

GAISMF-95-0089
EMD/ojm
24 October 1994

CONTRACTING OFFICERS REPRESENTATIVE
INACTIVE SHIP MAINTENANCE FACILITY (NNSY)
PORTSMOUTH, VIRGINIA 23709-5000

Subj: RADIOLOGICAL DECONTAMINATION SURVEY ON BOARD THE USS
KITTIWAKE (ASR-13)

Ref: (a) SC NO. B119-95; TDL NO. T001; Amendment NO. 000 (1)
(b) NAVSEADETPORTSVAINST P5090.1

Encl: (1) Radiological Decontamination Action Form

Per reference (a) and in accordance with reference (b), a
Radiological Decontamination Survey was conducted on board the
USS KITTIWAKE (ASR-13) on 21 October 1994.

Enclosure (1) provides specific results of this survey.


C. R. HILL
PROJECT MANAGER

Enclosure (2)

MANHOURS: 2 HOURS RADACS: IM 253/PD

LABOR COST: \$ _____ AN/PDR 27, E-140

TRAVEL COST: \$ 0 LUDLUM 2000, & MOD 2 & 3

MATERIAL COST: \$ 0

[Signature]

RAD AUTHORIZATION SIGNATURE

[illegible]

PetroChem

RECOVERY SERVICES

July 7, 1997

Global Associates
P.O. Box 520
Portsmouth, VA. 23705

Re: EX-KITTIWAKE (ASR-13)
Environmental Clean

To Whom it may concern:

All bilges (Engine Room and Shaft Alley), engine and equipment sumps fuel lines were cleaned and are free of petroleum products. Access covers to fuel and lube oil tanks are resealed with original gaskets, covers and nuts after the work was completed and Marine Chemist Certificates issued on spaces and Quality Assurance inspections for the vessel to be environmentally clean by PetroChem Recovery Services, Inc. has been accomplished. All tanks and spaces were inspected by Quality Assurance of Global Associates, a Chemist from Marine Chemist Services and PetroChem Recovery Services, Inc.

Sincerely,
PetroChem Recovery Services, Inc.

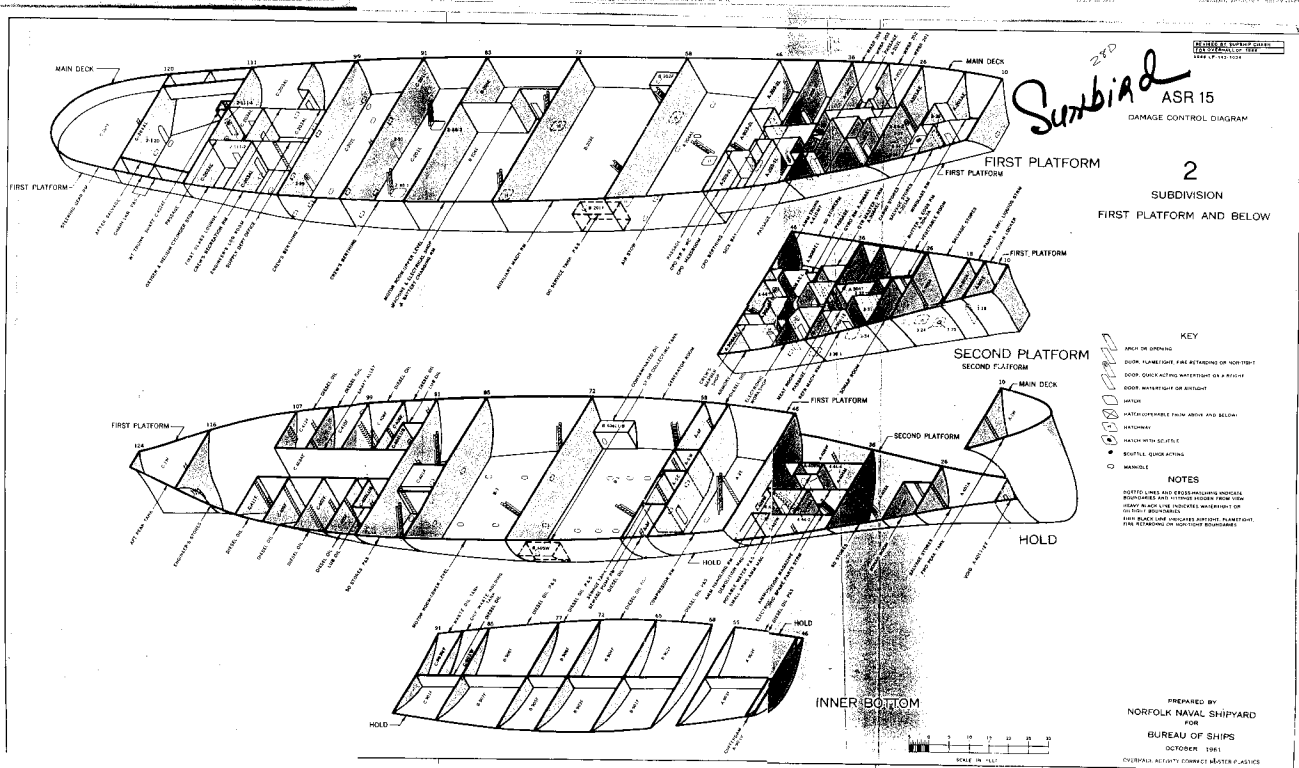
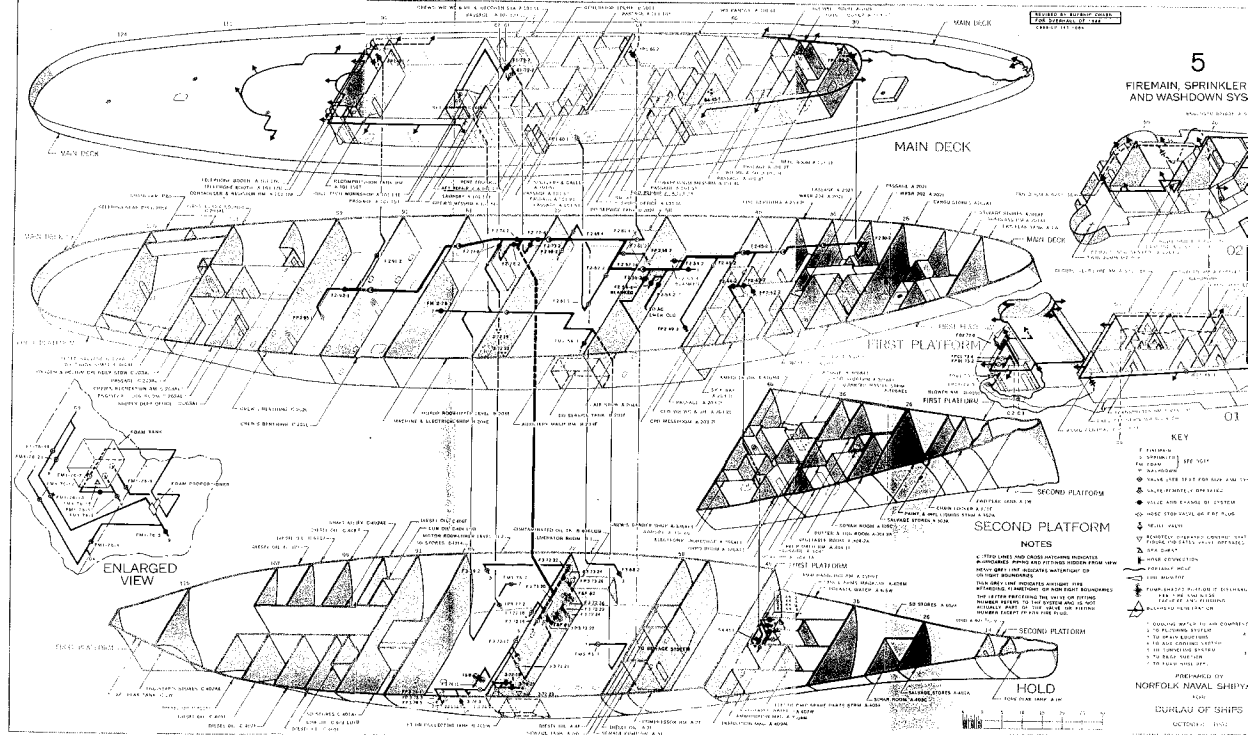


R. L. Clouch
Vice-President

KITTIWAKE ASB-13 FINAL TANK SOUNDINGS

V-29-27

<u>TANK #</u>	<u>FEET</u>	<u>LOCATION</u>
A-902-F	EMPTY	3-57-2
A-903-F	EMPTY	3-57-1
B-901-F	EMPTY	3-58-1
B-902-F	EMPTY	3-58-2
B-903-F	EMPTY	3-71-1
B-904-F	EMPTY	3-71-2
B-905-F	EMPTY	3-72-1
B-906-F	EMPTY	3-72-2
B-907-F	EMPTY	3-85-1
B-908-F	EMPTY	3-85-2
C-901-F	EMPTY	2-90-1
C-405-F	EMPTY	2-95-1
C-406-F	EMPTY	2-95-2
C-407-F	EMPTY	2-99-1
C-408-F	EMPTY	2-95-2
C-409-F	EMPTY	2-101-1
C-410-F	EMPTY	1-101-2
C-411-F	EMPTY	2-105-0
C-412-F	EMPTY	1-105-2
C-902-F	EMPTY	1-105-2
C-403-L	EMPTY	2-91-1
C-404-L	EMPTY	2-91-2
2190 L/O	EMPTY	2-47-3
2190 L/O	EMPTY	2-48-3
SETTLING B1-9250	EMPTY	2-71-1
A-406-W	EMPTY	FR 36-46 PORT & STBD
A-407-W	EMPTY	FR 36-46 PORT & STBD



Appendix D

Draft National Guidance: Best Management Practices for Preparing Vessels Intended to Create Reefs

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Draft National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs

June 24, 2004

U.S. Environmental Protection Agency

U.S. Maritime Administration

June 24, 2004

ACKNOWLEDGEMENTS

The U.S. Environmental Protection Agency's Oceans and Coastal Protection Division within the Office of Water developed this document with direct support from the Department of Transportation's Maritime Administration. To assist in document development, an interagency workgroup was established. The following agencies actively participated on this workgroup:

- Department of Transportation's Maritime Administration
- National Oceanic and Atmospheric Administration
- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- United States Coast Guard
- United States Department of the Navy
- United States Environmental Protection Agency

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EXECUTIVE SUMMARY

This guidance document was developed in response to the Maritime Administration's (MARAD) request for the U.S. Environmental Protection Agency (EPA) to provide national environmentally-based best management practices for the preparation of vessels to be sunk with the intention of creating artificial reefs in permitted artificial reef construction areas. It also satisfies the mandate of Section 3516 of the National Defense Authorization Act for Fiscal Year 2004, which requires that MARAD and EPA jointly develop guidance recommending environmental best management practices to be used in the preparation of vessels for use as artificial reefs.

Options for managing obsolete and decommissioned military and commercial vessels include re-use of the vessel or parts of the vessel, recycling or scrapping, creating artificial reefs, and disposal on land or at sea. This document discusses the preparation of vessels when employing the vessel management option of artificial reefing. Artificial reefs should be developed such that they enhance marine resources and benefit the marine environment. Strategically sited artificial reefs can not only enhance aquatic habitat, but also provide an additional option for conserving, managing, and/or developing fishery resources.

Although the best management practices presented in this document are intended for use when preparing vessels to serve as artificial reef habitat, the best management practices may have applicability to other in-water uses of vessels, such as the creation of recreational diving opportunities and placement as breakwaters or other types of barriers. It is recommended that these best management practices be implemented for all in-water uses of vessels, with the caveat that further vessel preparation beyond that employed for artificial reef habitat may be needed. When preparing a vessel for other permitted in-water uses, consideration should be given to vessel stability and integrity prior to and after final placement.

This guidance identifies materials or categories of materials of concern that may be found aboard vessels and specifically identifies where they may be found. For each material or category of material, this document provides a general clean-up performance goal and information on methods for achieving those goals in preparation of the vessel prior to sinking. Materials of concern include, but are not limited to: oil and fuel, asbestos, polychlorinated biphenyls (PCBs), paint, solids/debris/floatables, and other materials of environmental concern. Exhibit 1 provides a summary of the narrative clean-up goals for materials of concern.

This guidance does not substitute for any statute or regulation, nor is it a regulation itself. It does not impose legally binding requirements on any Federal agency, States, other regulatory authorities or the regulated community, and may not apply to a particular situation based upon the circumstances. Regulatory decision makers, both Federal and State, retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. EPA may change this guidance in the future.

Exhibit 1. Summary of Narrative Clean-up Goals for Materials of Concern

Material of Concern	Narrative Clean-up Goal
<i>Oil And Fuel</i>	Remove liquid hydrocarbons (fuels, oils) and semi-solids (greases) so that: no visible sheen is remaining on the tank surfaces (this includes all interior fittings, piping, structural members) or on the water surface when the equipment is flooded after sinking; no film or visible accumulation (i.e., spills on decking or rugs) is remaining on any vessel structure or component.
<i>Asbestos</i>	Remove any loose asbestos and asbestos that may become loose during vessel sinking; remove or seal accessible friable asbestos.
<i>Polychlorinated Biphenyls (PCBs)</i>	Remove all solid material containing PCBs greater than or equal to (\geq) 50 parts per million (ppm) unless a disposal permit has been granted under 40 CFR 761.62(c); remove all liquid materials containing PCBs.
<i>Paint</i>	Remove harmful exterior hull antifouling systems that are determined to be active; remove exfoliating and exfoliated paint.
<i>Solids/Debris/Floatables</i>	Remove loose debris, including materials or equipment that are not permanently attached to the vessel that could be transported into the water column during a sinking event.
<i>Other Materials of Environmental Concern</i>	Remove other materials that may negatively impact the biological, physical, or chemical characteristics of the marine environment.

There are statutory requirements and associated regulations, as well as permit processes applicable to the process of preparing a vessel for reefing that are not highlighted in this document. The narrative clean-up goals for the materials of concern highlighted in this guidance should be achieved while preparing a vessel for all in-water uses as earlier mentioned.

INTRODUCTION

Several options exist for managing obsolete and decommissioned military and commercial vessels. These options include re-use of the vessel or parts of the vessel, recycling or scrapping, creating artificial reefs, and disposal on land or at sea. This document discusses the vessel management option of artificial reefing. This guidance document was developed in response to the Maritime Administration's (MARAD) request for the U.S. Environmental Protection Agency (EPA) to assist in identifying potential management options for their decommissioned vessel fleet. It also satisfies the mandate of Section 3516 of the National Defense Authorization Act for Fiscal Year 2004, which requests that MARAD and EPA jointly develop guidance recommending environmental best management practices to be used in the preparation of vessels for use as artificial reefs.

An interagency workgroup, chaired by EPA, was established to develop national environmentally-based best management practices for the preparation of vessels to be sunk with the intention of creating artificial reefs in permitted artificial reef construction areas. The workgroup was comprised of representatives from the EPA, U.S. Coast Guard, U.S. Navy, MARAD, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service.

Although these best management practices are intended for use when preparing vessels to serve as artificial reef habitat, such best management practices may have applicability to other in-water uses of vessels, such as the creation of recreational diving opportunities and placement as breakwaters or other types of barriers. The best management practices presented in this document should be implemented for all permitted in-water uses of vessels; further vessel preparation may be needed based on the intended in-water use, such as breakwaters.

Objectives of the Guidance Document

This guidance satisfies the mandate of Section 3516 of the National Defense Authorization Act for Fiscal Year 2004, which amends existing law to require that MARAD and EPA jointly develop guidance recommending environmental best management practices (BMPs) to be used in the preparation of vessels for use as artificial reefs. These BMPs are to serve as national guidance for Federal agencies for the preparation of vessels for use as artificial reefs. Section 3516 provides that the BMPs are to (1) ensure that vessels prepared for use as artificial reefs "will be environmentally sound in their use as artificial reefs"; (2) "promote consistent use of such practices nationwide"; (3) "provide a basis for estimating the costs associated with the preparation of vessels for use as artificial reefs"; and (4) include measures that will "enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels." Appendix A provides further detail on Section 3516, and below is a description on how this document addresses the four requirements of the statute.

- The use of this guidance will ensure that vessels prepared for use as artificial reefs "will be environmentally sound in their use as artificial reefs." Best management practices are provided through performance goals that are directed at the level of cleaning and/or removing materials of concern aboard vessels. The preparation of vessels in this manner

will ensure that their use as artificial reefs is environmentally sound. The purpose of creating an artificial reef is to benefit the environment by enhancing aquatic habitat and marine resources, as well as providing an additional option for conserving, managing, and/or developing fisheries resources. This document describes appropriate vessel preparation that could achieve such benefits as an artificial reef and avoid negatively impacting the environment with pollutants. The performance goals provided in this document, if implemented and complemented with strategic siting, will maximize the opportunity for these vessels to benefit the environment as artificial reefs.

- The use of this guidance document will “promote consistent use of such practices nationwide” and in turn will also provide measures that will “enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels.” The best management practices described in this document will serve as national guidance for the preparation of vessels for use as artificial reefs. As the use of vessels as artificial reefs is becoming a more common management option for obsolete MARAD vessels, the development of this guidance document is timely. Currently, no guidance of this kind is available. The use of this guidance document can enhance the utility of MARAD’s Artificial Reefing Program by establishing a national approach to clean and prepare candidate obsolete vessels, while also promoting consistent use of such practices for vessel-to-reef projects.
- The use of this document will “provide a basis for estimating the costs associated with the preparation of vessels for use as artificial reefs.” Neither worker safety issues nor specific costs associated with clean-up procedures are discussed in this document; this document only addresses environmental impact and protection issues. Although the best management practices were developed independent of worker safety issues and specific costs associated with clean-up, the guidance in this document can be used as a tool in estimating the cost for appropriate vessel preparation. The methods, approach, and level of effort for clean-up, as well as worker safety concerns, are directly dependent on the vessel’s condition and the amount of materials of environmental concern that are found aboard. Vessels that pose potential safety risks would be expensive to clean and therefore may not be good candidates for reefing.

Some portions of a candidate vessel may be economically salvageable. Salvage operations should occur first, in a manner that will minimize debris and contamination with oils or other products that have to be cleaned up at a later date. This activity should allow for improved access for subsequent clean-up efforts, and the salvage proceeds may help offset the costs for vessel preparation.

Operations associated with salvage, clean-up, and diver access have the potential to adversely impact vessel stability. Failure to consider the impact of these activities on vessel stability before and during scuttling operations could result in premature and uncontrolled capsizing and/or sinking of the vessel. Therefore, vessel stability considerations should be an integral part of the salvage, clean-up, modification (for diver access), transport, and sinking plans of a ship to reef project.

In the process of preparing a vessel for reefing, there are requirements and regulations, as well as

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permit processes, to consider that are not highlighted in this document. The final preparation plan for any particular artificial reef project is case specific, and will depend on the characteristics of the vessel and final permitted artificial reef construction site, as well as regulatory considerations. Some legal authorities that may apply to vessel-to-reef projects are briefly described in Appendix B.

This guidance identifies materials or categories of materials of concern that may be present aboard vessels, indicates where these materials may be found, and describes their potential adverse impacts if released into the marine environment (Appendix C provides related information). The materials of concern include, but are not limited to: fuels and oil, asbestos, polychlorinated biphenyls (PCBs), paints, debris (e.g., vessel debris, floatables, introduced material), and other materials of environmental concern (e.g., mercury, refrigerants). With the exception of materials containing PCBs, it is not within the purview of this document to discuss Federal, State, or local regulations, although those requirements that are directly applicable to vessel preparation must also be met prior to vessel sinking and placement. Because the best management practices described in this document are directed at the environmental concerns associated with using vessels as artificial reefs, other sources of information should also be used with regard to preparation of the vessel from a diver safety perspective or for any other potential in-water uses (e.g., breakwaters or other types of barriers).

A detailed description and characterization of the potential sources of contamination from a vessel intended for use as an artificial reef should be conducted and a plan developed. The purpose of this plan is to assure that materials potentially contributing to pollution of the marine environment are addressed. Appendix D of this document presents information regarding the development of workplans; Appendix E provides information regarding general principles for clean-up operations.

This guidance does not substitute for any statute or regulation, nor is it a regulation itself. It does not impose legally binding requirements on any Federal agency, States, other regulatory authorities or the regulated community, and may not apply to a particular situation based upon the circumstances. Regulatory decision makers, both Federal and State, retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. EPA may change this guidance in the future.

Organization of this Guidance Document

This document describes guidelines for the preparation of vessels in a manner that will ensure that the marine environment will benefit from their use as an artificial reef. Strategic siting is an essential component of a successful artificial reef project. Before the discussion of vessel preparation is presented, reef siting is briefly discussed.

For each material or category of material of concern identified above, this document provides a general performance goal and information on methods for addressing those goals in preparation of the vessel prior to sinking. Additional information for each material includes a description of its shipboard use and where it may be found on a vessel, as well as its expected impacts if released into the marine environment.

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Although the best management practices presented in this document are intended for use when preparing a vessel to serve as artificial reef habitat, it is recommended that these best management practices be implemented for other in-water uses of vessels. Two such additional in-water uses include the sinking of vessels for recreational diving, and for placement as breakwaters or other types of barriers. These potential obsolete vessel management options are briefly described in this document.

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SITING OF ARTIFICIAL REEFS

Artificial reefs can enhance marine resources and in turn benefit the marine environment; however, creating a successful reef entails more than randomly placing miscellaneous materials in ocean, estuarine, or other aquatic environments. Planning (including siting), long-term monitoring, and evaluation are necessary components of each project to ensure that the anticipated benefits of artificial reefs are attained. Improperly planned, constructed, or managed reefs may be ineffective, may cause conflict among competing user groups of the reef site, may increase the potential to over harvest targeted species, or may damage natural habitats. In such cases, the anticipated benefits of an artificial reef project may be negated.

Artificial reefs should not cause harm to existing living marine resources and habitats. Properly prepared and strategically sited artificial reefs can enhance fish habitat, provide more access to quality fishing grounds, and provide managers with another option for conserving, managing and/or developing fishery resources.

Placement of a vessel to create an artificial reef should:

- enhance and conserve fishery resources to the maximum extent practicable;
- facilitate access and use by recreational and/or commercial fishermen;
- facilitate, as appropriate, access and use by recreational divers;
- minimize conflicts among competing uses of water and water resources;
- minimize environmental risks and risks to personal and public health and property;
- be consistent with international law and national fishing law and not create an obstruction to navigation;
- use the best scientific information available; and
- conform to any Federal, State, or local requirements or policies for artificial reefs.

Artificial reef project planners should identify the habitat type and/or species targeted for enhancement and determine which biological, physical, and chemical site conditions will be most conducive to meeting the reef objectives. Once these siting conditions including community settlement and recruitment dynamics are determined, they should be used in identifying potential construction sites. Existing communities (e.g., infaunal, epifaunal, benthic, demersal, mid-water, surface-oriented) in the area where the artificial reef is to be placed should be considered prior to placement -- this should include monitoring to establish baselines for the fishing resources.

Caution should be exercised when developing artificial reefs in nearshore areas due to the increased potential for resource competition as well as competition for niche space. Improperly sited reefs might enhance a recreational fish resource at the expense of other species or habitat; it

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may also alter the ecological balance of the area. For example, sandy estuarine habitat often provides critical nursery grounds for the juveniles of many species of bottom fish. During this life stage, the primary predator protection for these juvenile fish is the absence of large fish -- which are favored by recreational anglers. Often times, sandy estuarine locations tend to be popular choices for siting artificial reefs to attract large fish for recreational fishing, thereby altering existing predatory/prey interactions and creating resource competition. Strategic project planning can minimize these conflicts.

Artificial reefs should not be constructed such that they are placed on or threaten the integrity of natural habitats such as:

- existing coral reefs;
- significant beds of aquatic grasses or macroalgae;
- oyster reefs;
- scallop, mussel, or clam beds; or
- existing live bottom (i.e., marine areas supporting growth of sponges, sea fans, corals, and other sessile invertebrates generally associated with rock outcrops).

The goals and priorities of an artificial reef project should direct overall site selection. Within the identified target area, existing natural and artificial reefs and known bottom obstructions should be identified. Exclusion areas for potential artificial reef projects should include, but are not limited to:

- shipping lanes;
- restricted military areas;
- areas of poor water quality (e.g., low dissolved oxygen, dredged material disposal sites);
- traditional trawling grounds;
- unstable bottoms;
- areas with extreme currents, or high wave energy;
- existing right-of-ways (e.g., oil and gas pipelines and telecommunication cables);
- sites for purposes that are incompatible with artificial reef development; and
- areas designated as habitat areas of particular concern or special aquatic sites.

The bottom composition and configuration at an artificial reef site affects reef stability and longevity and should be carefully evaluated in the site selection process. In most cases, soft sediments such as clays, silts, and loosely packed sands should be avoided. Over time, artificial reef materials may sink into these sediments or become partially covered.

Caution should also be exercised where coastal physical processes can greatly influence a potential artificial reef site. Artificial reef planners should be aware that bottom sediments shift and may change significantly during storms, hurricanes, and geologic events. Materials that present large amounts of surface area may scour deeply into almost any bottom type, depending upon storm events, currents, or wave action.

The principle hydrographic factors to be considered in selecting sites for artificial reef placement include water depth, potential wave height, currents, and tides. Water depth is a significant siting criterion. Artificial reefs should be placed in water at sufficient depths in order to avoid creating a hazard to navigation – minimum clearance above the reef should accommodate the draft of the vessels expected to operate in the vicinity. Water depth at the site may critically affect artificial reef material stability and long-term structural integrity. In this case, average wave energy in large, open bodies of water as a function of water depth is the major concern.

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Guidance for Preparing Vessels to Create Artificial Reef Habitat

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Narrative Clean-up Goal: Remove liquid hydrocarbons (fuels, oils) and semi-solids (greases) so that: no visible sheen is remaining on the tank surfaces (this includes all interior fittings, piping, structural members) or on the water surface when the equipment is flooded after sinking; no film or visible accumulation (e.g., spills on decking or carpet) is remaining on any vessel structure or component.

Environmental Impacts

The impacts of fuel and/or oil introduced into the marine environment are influenced by a variety of factors, including the physical properties of the oil, whether the oil is petroleum based or non-petroleum based, and the hydrodynamic properties of the receiving waters. Each type of oil has distinct physical properties that affect the way it disperses and breaks down, the hazard it may pose to ecosystems, and the likelihood that it will pose a threat to manmade resources. For example, the rate at which surface dispersion occurs will help to determine the effect of an oil spill on the environment. Most oils spread horizontally into a smooth and continuous layer, called a “slick,” on the water surface.

Petroleum based and non-petroleum based oils can have both immediate and long-term adverse effects on the environment. These oils can be dangerous, or even deadly to wildlife. Light refined petroleum products, such as gasoline and kerosene, spread on water surfaces. The risk of fire and toxic exposure is high, but the products evaporate quickly and leave little residue. Alternatively, heavier petroleum based refined oil products may pose lesser fire and toxic hazards and do not spread on water as readily. However, heavier oils are more persistent in the environment, and may present a greater clean-up challenge.

Many non-petroleum oils have physical properties similar to those of petroleum based oils. For example, their solubility in water is limited, they both create slicks on the water surface, and they both form emulsions and sludge. In addition, non-petroleum oils tend to be persistent, remaining in the environment for long periods of time.

Oil spills can harm the environment in several ways, including the physical damage that directly impacts wildlife and their habitats, and the toxicity of the oil and its constituents, which can poison exposed organisms. Spilled oil in the environment immediately begins to disperse and degrade, with concomitant changes in physical and chemical properties. As these processes occur, the oil threatens natural resources, including birds and mammals as well as a wide range of marine organisms linked in a complex food web. Some organisms can be seriously injured (non-lethal effects) or killed (lethal effects) very soon after contact with the oil in a spill (acute effects), however; non-lethal toxic effects are often more subtle and often longer lasting (chronic tests).

What are oil and fuel?

For purposes of this guidance, the term oil includes crude oil; petroleum and petroleum-refined

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products (e.g., diesel fuel, gasoline, kerosene, and bunkers); and non-petroleum oils such as synthetic oils (e.g., silicone fluids), tung oils, wood-derivative oils (e.g., resin/rosin oils), animal fats and oil, and edible and inedible seed oils from plants.

Some common refined petroleum products and their characteristics are as follows:

- **No. 2 Fuel Oil** is a lightweight substance that flows easily, spreads rapidly, and disperses readily. It is neither volatile nor likely to form emulsions.
- **No. 4 Fuel Oil** is a medium weight substance that flows easily and is readily dispersed if treated promptly. It has a low volatility and moderate flash point.
- **No. 5 Fuel Oil (Bunker B)** is a medium to heavyweight substance with a low volatility and moderate flash point. Dispersion is very difficult and potentially impossible.
- **No. 6 Fuel Oil (Bunker C)** is a thick substance that is difficult to pump and requires preheating for use. No. 6 fuel oil may be heavier than water. It is not likely to dissolve, and is likely to form tar balls, lumps, or emulsions. No. 6 fuel oil is very difficult or impossible to disperse. It has a low volatility and moderate flash point and is especially persistent in the environment.

Where are oils and fuels found in a ship?

Diesel fuel and fuel oil may be contained in various tanks throughout a ship. For example, lubricating oil is found in engine sumps, drums of unused lubricating oil in ship storerooms or engineering spaces, and sludge in fuel and cargo tanks. Hydraulic systems and components also contain oils.

The vessel's piping and tank arrangements generally will contain some oil, fuel, sludge, and associated residues. Fuel oil may be found in both integrated and freestanding tanks throughout the ship. Lubricating oils may be found in a variety of tanks depending on their individual use. System oils are generally located in engine room sump tanks, while cylinder oils and lubrication oils will be stored in tanks dedicated for a specific purpose.

“Used oil” -- any oil that has been refined from crude oil or any synthetic oil that has been used and, as a result of such use, is contaminated by physical or chemical impurities -- also may be found on ships. Used oil includes spent lubricating fluids that have been removed from engine crankcases, transmissions, and gearboxes; industrial oils such as compressor, turbine, and bearing oil; metal working oil; and refrigeration oil.

Vessel Preparation

The aim of hydrocarbon clean-up is to remove liquid hydrocarbons (fuels, oils). Although it is impossible to remove all hydrocarbon contaminants, a very thorough clean-up is achievable. In general, all liquid hydrocarbons and semi-solids (greases) should be drained, flushed, and

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cleaned from fuel/lube and fluid system equipment (including piping, interior fittings, and structural members) so that no visible sheen remains on the tanks or other associated fluid system structures or on the water surface when the equipment is flooded after sinking. The opening and cleaning of pipes varies according to the type of hydrocarbon product that was in the lines. No visual evidence of hydrocarbon weeping (oozing or releasing drops of liquid) should exist at openings. Suggested cleaning methods for liquid hydrocarbons (fuels, oils, and semi-solids) are found in Appendix F.

If structural tanks are flooded, oil absorbent pads and excess loose oil absorbent material should be removed and liquid hydrocarbons should be cleaned from the tanks so that no visible sheen is present on the water surface. An alternative and very effective option for hydrocarbon clean-up is removal of the equipment and piping.

During vessel preparation, an economical way of managing used oil is recycling. It should be noted that additional used oil might be generated during the final preparation of the vessel prior to sinking. Such used oil should be removed from the vessel before sinking. It may be acceptable to leave old oil and grease in place if it is determined visually to be dried/solidified and therefore is not likely to cause a sheen.

Fuel and Oil Tanks

All fuels and lubricants should be drained from the tanks and the tanks flushed. Merely sealing tanks, whether as the sole means of fuel and oil tank preparation or in combination with partial tank draining, is insufficient. Over time, the integrity of the sealed tanks will eventually be compromised as marine growth density increases and the ship's underlying structural components decay. The placement of the Liberty ship Joseph L. Meek, sunk off Escambia County, Florida in 1976, demonstrated that corrosion of the ship's metal will eventually release residual fuel sealed in tanks into the environment. Although sealing the tanks without removing the contents is not sufficient for managing fuel and oil on a vessel intended to serve as an artificial reef, fuel/lube and fluid system equipment and piping intended to stay on the vessel should be sealed as necessary for the purpose of towing stability once the fuel/oil has been removed. Because these systems need to be opened during vessel preparation for draining and flushing the systems clean, sealing these systems may be necessary to help maintain vessel stability during transit to the designated artificial reef site.

There are several accepted and widely used methods to clean fuel and oil tanks. The appropriate method will be determined by the type of hydrocarbons in the tank, the amount of residue in the tank, and the extent of any hard or persistent deposits or residues. In general, lower quality fuels and heavy oils will require more cleaning effort. Similarly, tanks for dirty or water-contaminated oils will require more cleaning effort.

When cleaning tanks, the following factors should be considered: worker access and safety issues, machinery and resources available, and the methods or facilities available to deal with the cleaning residues. It may be necessary to experiment with several cleaning methods to see which best suits the particular circumstance.

Some methods for cleaning tanks are detailed in Appendix E. Regardless of the selected tank cleaning method, the effluent and water must be collected, treated, and disposed of in

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compliance with applicable regulations. Large volumes will require the services of a pumper truck or barge, while smaller quantities should be collected and stored in drums. Caution should be used during all transfer operations to avoid spills. If transferring large quantities of oil or oil contaminated liquid, a containment boom around the vessel should be used to minimize the extent or spreading of an accidental release.

Structural and Non-structural Tanks

All structural and non-structural tanks are assumed to be contaminated by hydrocarbons until proven otherwise. Structural tanks include, but are not limited to: fuel storage/settling/service/day tanks, cargo tanks, oil tanks, structural hydraulic tanks, fresh water tanks, ballast tanks, stabilizer tanks, black and gray water tanks, voids, and cofferdams.

Tank interiors including deckheads should be cleaned of all hydrocarbons. No visible hydrocarbons should remain on the tank surfaces (this includes all interior fittings, piping, structural members), or on the water surface when flooded after sinking. No emulsified oil, as determined by visual inspection, should remain. Oil absorbent pads and excess loose oil absorbent material should be removed before sinking.

Gauges and Gauge Lines

Pressure gauges and gauge lines are assumed contaminated with the product that they were intended to measure. Fluid filled gauges should be removed. Pressure gauges and gauge lines should also be removed to prevent oil seepage from these lines. Lines that remain in place should be flushed, and the lines cleaned.

Special care should be exercised with mercury thermometers and pressure (typically vacuum) measuring devices. These should be removed intact from the vessel. Temperature gauges that do not contain any hazardous material can remain in its position. Other measuring instruments should be removed from the vessel or opened for cleaning, examination, and possible removal.

Combustion Engines

Combustion engines include any reciprocating engine in which fuel is consumed (diesel, gasoline, gases), stirling cycle engines, and gas turbines. The entire fuel/oil system should be drained and flushed. Any items (e.g., oil filters and strainer elements) that can not be flushed should be removed.

Combustion engines and associated manifolds should be thoroughly drained, flushed, and cleaned. Machinery need not be removed if it is completely drained and the sumps flushed and cleaned. Sometimes, engines are removed for reuse or to assure that all oil is removed before reefing. In some cases, it might be less expensive to remove and dispose of the engines than to clean the oil from them. Some methods for cleaning combustion engines are detailed in Appendix E.

Non-combustion Engines, Shafting, Gearing and Stern Glands

Main gear boxes and associated clutches should be drained of all lubricating oils. Internal gear sprayers, lubricating lines, and other components should be removed, or drained. External pedestal and thrust bearings should be drained.

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Stern tubes and seals, if of the oil bath type, should be drained of oil. Note that draining the stern tubes and seals may require extraordinary measures to preserve the watertight integrity of the vessel during the clean-up and salvage operation.

Vessels that are equipped with thrusters, Z-drives, or other methods of unconventional propulsion systems will be addressed on a case-by-case basis. The objective is that no hydrocarbons remain in the propulsion system.

Steering Gear

Hydraulic pumps and associated piping and fittings should either be removed or drained and flushed clean. Hydraulic telemotor systems should be treated similarly. Grease lines and reservoirs for rudder heads should be removed from the ship, or opened and cleaned. Vessels with combined propulsion and steering systems should be addressed in the same manner as that which is provided under the above mentioned “non-combustion engines, shafting, gearing, and stern glands” subsection.

Auxiliary Machinery

Auxiliary machinery that has a liquid hydrocarbon as its working fluid should be completely drained and flushed clean. Auxiliary machinery refers to machinery and components that are not an integral part of the main propulsion system of the vessel. The term can include but is not limited to: pumps, motors, compressors, galley equipment, capstans, elevators, and cargo handling machinery. Many pieces of auxiliary machinery have a lubricating oil system or are in direct contact with liquid hydrocarbons.

All lubricating oil system components should be stripped from auxiliary machinery, drained and cleaned. Lubricating oil sumps should be drained and cleaned.

Hydraulics

Unless there is acceptable proof to the contrary, all hydraulic systems should be assumed to have employed a hydrocarbon based fluid. Hydraulic lines should be removed from the vessel, or opened and blown through with air until clear. Hydraulic fittings (valves and valve blocks of all types, cylinders, pumps, accumulators, filters, coolers) should be removed from the ship or drained clean. Hydraulic sumps should be opened and drained clean.

Grease

All grease reservoirs should be removed from the ship, or opened and cleaned. Grease lines should be removed or blown through until clear and all visible grease accumulations should be removed so that no visible sheen is remaining on the water surface when these structures are flooded after sinking. Machinery that employs grease-packed gearboxes (common on deck machinery), as well as grease packed couplings, stuffing boxes, chain sprockets, and worm drives should be opened and cleaned of grease. Grease on chains and sprockets should be removed. Greased cables should be cleaned or removed from the vessel so that no visible sheen is remaining on the water surface when these structures are flooded after sinking.

Sealed rolling element bearings that contain grease can be left in-situ. Grease in other fittings such as stuffing boxes and glands can be left in situ if the seals are intact and the quantities are

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small (for example, less than 100 milliliters evenly distributed throughout the component). Any grease on the outside of the sealed bearings should be removed.

Bilge Areas

The bilge area includes all areas that would be subject to contact with oily water, or may be a catch area for spills from cargo holds or storerooms, and interior surfaces which may have been subject to hydrocarbon contamination through sprays, spills, or disposal. Bilge areas also include the plating and all surfaces of attached stiffeners and fittings. Bilge areas should be free of visible oils, greases, and sludge. Oil or grease films evident to the touch should be removed. Any debris contaminated with hydrocarbons should be removed. Any cleaning fluids used to clean the bilge should be removed from the vessel. Accumulations of loose oil absorbent material should be limited to those amounts that cannot reasonably be picked up with brooms and vacuums.

Cleaning bilges is frequently complicated by poor access caused by piping, gratings, and equipment. In many cases, it is cheaper and easier to remove the dirty or contaminated items that limit access than to clean the items as well as the bilge. Once clean, bilges are very vulnerable to recontamination. Note the following recontamination issues:

- Piping, valves, and fittings in hydrocarbon systems will continue to drip for some time after initial draining. Over a short period of time, these drips can lead to a major rework cleaning effort. Therefore, drips should be captured whenever possible; drip pans should be emptied frequently.
- Containers used for clean-up are vulnerable to tipping and spilling, especially in conditions -- such as poor lighting -- that are often found in vessels undergoing sinking preparation. Remove containers used for clean-up when they are full.
- Water should not be allowed to enter bilges unless it is part of a planned clean-up effort. Water that otherwise enters the bilge should be handled as oily wastewater.

In general, the approach and methods recommended for cleaning bilges are the same as for cleaning tanks.

Decks and Floor Coverings

Oil and grease films on deck coverings should be cleaned. Decks and floor coverings include ceramic tile, linoleum and linoleum tile, carpet, and continuous floor coverings. In compartments subject to hydrocarbon spills during the vessel's life (e.g., workshops, compartments with fuel or oil tank overflows or tank covers), the deck covering and underlayment should be examined for oil saturation. Floor coverings or underlayment that has been saturated with hydrocarbons should be removed from the vessel.

Bulkheads and Deckheads

Bulkheads and deckheads should be cleaned of oil and grease films. Where it is evident that a spill or accumulation resulting from leaks has occurred, coverings should be removed to reveal the full extent of the spill or accumulation.

Narrative Clean-up Goal: Remove any loose asbestos and asbestos that may become loose during vessel sinking; remove or seal accessible friable asbestos.

Environmental impacts

Asbestos is a naturally occurring mineral. The environmental impacts caused by asbestos are dependent upon 1) whether asbestos is reduced to fibers or is in a non-friable form; and 2) whether the asbestos is air-borne or water-borne.

Even though adverse impacts from asbestos are largely from inhalation -- which is not expected to be an issue in the marine environment -- vessel preparation should eliminate the possibility of pieces of asbestos breaking free from the vessel during the sinking operation or asbestos materials losing surface integrity after the vessel has been placed as an artificial reef. Loose asbestos pieces can lead to rafting and may be capable of washing ashore. These asbestos pieces could dry up, break apart, and be reintroduced into the atmosphere. Exposure to airborne asbestos can negatively impact human health via inhalation.

Once a vessel has settled on the ocean floor, asbestos remaining on the vessel (e.g., intact and undisturbed asbestos insulation) will be covered with bacteria over time. This in turn will cause the asbestos fibers to sink and remain contained within the reef matrix, minimizing any potential direct impacts to the marine environment. (see Appendix C)

What is asbestos?

Asbestos refers to a group of minerals that occur naturally as masses of long silky fibers. There are three main types of asbestos fibers:

- Chrysotile fibers (white asbestos) are fine, silky flexible white fibers. They are pliable and cylindrical, and arranged in bundles. This was the most commonly used asbestos in the United States.
- Amosite fibers (brown asbestos) are straight, brittle fibers that are light grey to pale brown. This was the most commonly used asbestos in thermal system insulation.
- Crocidolite fibers (blue asbestos) are straight blue fibers that are like tiny needles.

There are three other types of asbestos fibers: anthophyllite, tremolite, and actinolite. Unlike most minerals, which turn into dust particles when crushed, asbestos breaks up into fine fibers that may be too small to be seen by the human eye.

Individual asbestos fibers are often mixed with a material that binds them together, forming what is commonly called asbestos-containing material (ACM). There are two kinds of ACM: Friable

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and non-friable.

- **Friable ACM** is any material containing more than 1% asbestos that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
- **Non-friable ACM** is any material containing more than 1% asbestos that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable ACM is divided into two categories.
 1. **Category I** non-friable ACM includes asbestos-containing resilient floor coverings, packings, and gaskets.
 2. **Category II** non-friable ACM includes all other non-friable ACM that is not included in Category I.

Asbestos is resistant to abrasion and corrosion, inert to acid and alkaline solutions, and stable at high temperatures. It is strong yet flexible, non-combustible, conducts electricity poorly, and is an effective thermal insulator.

Where is asbestos found on a ship?

Asbestos on ships may be found in many materials, including, but not limited to:

- Bulkhead and pipe thermal insulation
- Bulkhead fire shields/fireproofing
- Uptake space insulation
- Exhaust duct insulation
- Electrical cable materials
- Brake linings
- Floor tiles and deck underlay
- Overhead and panel sheeting (cement and cellulose based)
- Steam, water, and vent flange gaskets
- Adhesives and adhesive-like glues (e.g., mastics) and fillers
- Sound damping
- Molded plastic products (e.g., switch handles, clutch facings)
- Sealing Putty
- Packing in shafts and valves
- Packing in electrical bulkhead penetrations
- Asbestos arc chutes in circuit breakers
- Pipe hanger inserts
- Weld shop protectors and burn covers, blankets, and any fire-fighting clothing or equipment
- Any other type of thermal insulating material

NOTE: Asbestos-containing material may be found underneath materials that do not contain

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asbestos. Thermal system insulation and surfacing material found in vessels and vessel sections constructed after 1980 may be presumed to be free of asbestos containing material.

Vessel Preparation

Asbestos can be found throughout ships, from the bridge to the bottom of the bilge. Identifying the locations and types of asbestos onboard are essential for vessel preparation and should be considered early in the clean-up process. Once the type and location of asbestos and asbestos containing materials are identified, a determination should be made whether to remove, encapsulate, or leave the asbestos undisturbed.

The method of demolition is particularly important to the effective management of asbestos on board ships. If the sinking method for the vessel includes the use of explosives, asbestos-containing material that may become disturbed during detonation should be removed from the vessel.

In addition, any asbestos that is moved or disturbed (including during clean-up operations) or can potentially get dislodged as the vessel sinks should be removed from the vessel. Friable asbestos should be sealed as a precautionary measure to prevent releases of asbestos in high concentrations during the sinking event. Intact and undisturbed asbestos insulation need not be removed.

Engine Room and Engine Compartments

Removal or encapsulation of exposed, disturbed and deteriorated asbestos should be considered since it is likely that the asbestos will break free and create debris during sinking. If the asbestos is to be encapsulated, its integrity should not be impacted by the preparation for sinking as well as the sinking itself.

The primary source of friable asbestos is found on pipe wrappings around the main boilers and steam fittings. On most vessels the asbestos coating, which is 1 to 3 inches thick, is covered with canvas and is usually painted. If work needs to be done around the piping and the covering, causing the asbestos to be disturbed, the disturbed material should be removed. If the covering is deteriorated and it is likely that the asbestos will break free during sinking, then removal or encapsulation with an epoxy or other non-water soluble and non-toxic sealer should be considered.

Certain boilers and piping are covered with a very friable asbestos paste. Throughout the engine room there are numerous asbestos gaskets connecting piping and ductwork. If left intact, these gaskets usually will not release asbestos fibers. However, if the ductwork or piping needs to be cut or removed and vessel debris is created as a result, gaskets should be removed or encapsulated if possible.

In some engine rooms asbestos/cellulose sheets are found behind power and electrical panels or in the overhead where electrical service passes. Undisturbed, this material is not friable. However, once the sheets are exposed to the marine environment, the sheets lose their integrity and can break up and raft. Where possible, these sheets should be removed. Note that asbestos

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cement sheets may also be used as panels on the vessel. However, these sheets are not water-soluble and therefore should not break apart when exposed to the marine environment. These sheets can stay in place unless cut, drilled or disturbed. Friable asbestos may also be found between bulkheads; this asbestos may remain in place because the asbestos is contained within the bulkheads. If, however, the bulkheads are drilled, cut, or disturbed, the friable asbestos that is now exposed should be encapsulated or removed.

Ship Interior and Living Spaces

Asbestos was also used in some hatch gaskets mixed with rubber throughout ships, especially in watertight spaces. Under normal circumstances this will only present a problem if grinders or torches are used. In such cases, the gaskets should be removed prior to disturbance.

Asbestos/asphalt floor tile was common from the 1940's to the mid 1970's. This form of asbestos is manufactured with the asbestos encapsulated. If preparation of the vessel requires the tile to be disturbed via grinding, cutting, or burning, those pieces of tile should be removed. Asbestos sheets both with cement and cellulose may be found especially in the combat information center, the radio room and other spaces where electrical equipment may be found. Cellulose/asbestos panels should be removed but cement panels are safe. As an example, while inspecting an old Navy tug planned for reefing off the coast of Virginia, it was determined that the entire interior of the wheel house was paneled with cellulose/asbestos panels and had to be removed.

Exterior Spaces

There are a few areas on the exterior of ships where asbestos was used. Asbestos may have been mixed with paint and applied as a coating near some vents and hatches. Also, some hatches may have gaskets that contain asbestos. In either case, the material does not need to be removed unless these exterior areas require grinding or cutting.

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POLYCHLORINATED BIPHENYLS (PCBs)

Narrative Clean-up Goal: Remove all solid material containing PCBs greater than or equal to (\geq) 50 parts per million (ppm) unless a disposal permit has been granted under 40 CFR 761.62(c); remove all liquid materials containing PCBs.

Environmental Impacts

PCBs are persistent and bio-accumulative. PCBs bio-accumulate in fatty or lipid rich tissues. PCBs have a limited solubility in aqueous solutions and it is suspected that PCBs can leach into a marine or aqueous environment (sediment and water column) where they can be taken up by organisms in the food web. PCBs bioaccumulate in fish and other animals; PCBs also bind to sediments. As a result, people who ingest fish may be exposed to PCBs that have been released into the environment.

There is a risk of human exposure during vessel preparation and after sinking the vessel. During vessel preparation, typical routes of human exposure include inhalation, accidental ingestion, or dermal contact. After sinking, exposure routes may be limited to accidental ingestion or contact with contaminated water or ingestion of contaminated fish, shellfish, or crustaceans. (see Appendix C)

What are PCBs?

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs, which were domestically manufactured from 1929 until their manufacture was banned in 1979, have a range in toxicity and vary in consistency from thin light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Where are PCBs found on a ship?

Although no longer commercially produced currently in the United States, PCBs are present in vessels deployed before the 1979 PCB ban. PCBs are found in both the solid (waxy) and liquid (oily) forms in equipment and materials on ships that were built leading up to the ban. The equipment and materials that may contain PCBs in concentrations of at least 50 ppm include:

- Cable insulation
- Rubber and felt gaskets
- Thermal insulation material including fiberglass, felt, foam, and cork
- Transformers, capacitors, and electronic equipment with capacitors and transformers inside

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- Voltage regulators, switches, reclosers, bushings, and electromagnets
- Electronic equipment, switchboards, and consoles
- Adhesives and tapes
- Oil used in electrical equipment and motors, anchor windlasses, hydraulic systems, and leaks and spills
- Surface contamination of machinery and other solid surfaces
- Oil-based paint
- Caulking
- Rubber isolation mounts
- Foundation mounts
- Pipe hangers
- Fluorescent light ballasts
- Any plasticizers

Items containing PCBs may be found throughout a ship and are not easily identifiable or accessible. PCBs may be found in a variety of shipboard materials, but the location and concentration may vary from item to item and within classes of items. PCB containing materials can also vary from ship to ship, and even ships in the same class can contain differing amounts of PCB containing materials. While these materials may be found throughout a ship, several areas on ships may have an increased likelihood of containing PCB bearing materials: areas or rooms subject to high heat or fire situations such as boiler rooms, engine rooms, electrical/radio rooms, or weapons storage areas.

Vessel Preparation

Even though it is not the intent of this document to focus on regulatory requirements, PCBs are regulated for disposal under 40 CFR Part 761, and will be discussed in this context. The regulations require that materials containing PCBs ≥ 50 ppm cannot be disposed in the marine environment. Although the ship itself is being “reused” or “recycled” as an artificial reef, the PCBs have reached the end of their useful life and must be removed and disposed. Disposal requirements are referenced below (also see Appendix B).

Where there is reason to suspect that equipment or components may contain PCBs ≥ 50 ppm, either remove the equipment or component from the vessel, provide proof that the equipment or component is free of PCBs, or apply to EPA for a PCB disposal permit. Thermally removing PCB containing materials is prohibited, as PCBs may volatilize or form dioxin or dioxin-like compounds. Because PCB sampling and analytical procedures can be expensive and time consuming, there may be situations when the cost of sampling and analysis far exceed the cost for removal and disposal. In such cases, previous ship to reef projects have shown that removal of all electrical cables and wires suspected of containing some level of PCBs is more economical.

Liquid Materials Containing PCBs

Remove all liquid filled electrical equipment suspected of containing PCBs or PCB contaminated dielectric fluid. Materials such as lubricating oils and greases used for winches and cargo-

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handling machinery, hydraulic fluids, heat transfer fluids, and waste oils should be removed from the vessel as presented in the “Oil and Fuel” Section of this document.

Solid Materials Containing PCBs (non-liquid PCBs)

Remove all solid materials containing PCBs ≥ 50 ppm, which includes but is not limited to felt gasket and faying material, cables, paints, rubber gaskets as well as battle lanterns and fluorescent light ballasts. EPA recognizes that non-liquid PCBs may be difficult to locate and remove and that removal may jeopardize the integrity of the ship. If non-liquid PCBs ≥ 50 ppm are to remain in the vessel, then 40 CFR Part 761 requires you to obtain a PCB disposal permit under 40 CFR 761.62(c).

PAINT

Narrative Clean-up Goal: Remove harmful exterior hull antifouling systems that are determined to be active; remove exfoliating and exfoliated paint.

Environmental Impacts

Scientific investigations by governments and international organizations have shown that certain anti-fouling systems (AFS) used on vessels pose a substantial risk of both acute and chronic toxicity and other adverse impacts to ecologically and economically important non-target marine organisms. Because this document addresses vessels that would be sunk for the creation of artificial reef habitat, the presence of biocides and other anti-fouling systems that inhibit marine growth are antithetical to this purpose. Furthermore, because anti-fouling systems can be reactivated via physical disturbance and/or biological degradation (e.g., scouring during a storm event or burrowing caused by marine organisms) over time, anti-fouling systems that retain potency may become harmful or be reactivated following the sinking. (see Appendix C)

What types of paint and anti-fouling systems are used on ships, and where are they found?

Paint and preservative coatings can be found on both interior and exterior surfaces of a ship. Particularly on older ships, paint may be flammable or may contain toxic compounds, such as polychlorinated biphenyls (PCBs), heavy metals (e.g., lead, barium, cadmium, chromium, and zinc), and biocides. Lead compounds, such as red lead tetraoxide (Pb_3O_4) and lead chromate, have been used extensively in marine paint. Other paints containing biocides, such as organotin (including compounds such as tributyl tin), have been used on the hulls of ships to prevent the buildup of marine organisms (e.g., bacteria, protozoa, barnacles, and algae).

Paints

Paint above the water line (topside paint) is not designed to leach because these paints are designed to protect topside surfaces from physical degradation and do not typically contain antifoulant biocides like that of anti-fouling coatings. However, these paints may contain biocides added as in-can preservatives.

Anti-fouling System

For most types of candidate vessels for reefing, the paint-related contaminants of concern are limited to exterior hull coatings below the water line. These hull coatings consist primarily of antifouling (AF) agents (biocides) such as copper, organotin compounds, and zinc.

Vessel Preparation

Anti-fouling Underwater Hull Coatings

If there is minimal active biocide remaining on the vessel, no preparation to the underwater hull area is necessary. It can be assumed that biocide activity is minimal if the anti-fouling coating

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on a candidate vessel is more than twelve years old **and** essentially all the underwater hull area is covered with marine growth.

When assessing the efficacy of the anti-fouling system (AFS), existing documentation relating to the anti-fouling properties of the hull coating could provide supporting information when determining if such coatings should be removed. Sources for such supporting information include, but are not limited to the following: a document search on the type and age of the existing AFS, the most recent repainting or dry-dock cycle, the most recent underwater hull cleaning, and when necessary, a physical, underwater hull examination by trained divers or remote operating vehicles. Repair and maintenance records for the vessel should provide the dates when the vessel was last removed from the water for hull maintenance.

If anti-fouling coatings on candidate vessels are at least twelve years old, the AF coatings can be left in place without further evaluation, as they are likely to be no longer harmful. If satisfactory evidence relating to underwater hull coating types and coating application dates is not available, and if the AF coating seems to be inhibiting fouling growth according to established AF paint efficacy, further evaluations should be carried out to ascertain the current anti-fouling properties of the coating.

If there is a lack of documentation, lack of fouling presence, or a reason to believe that the AFS is active, further evaluation of the AFS should be conducted. If it is determined that the AFS is active, the system should be removed to prevent the release of the AFS's harmful biocides.

Interior and Exterior, Above the Waterline Paints

In some cases, interior and exterior paints onboard vessels may contribute to debris/floatable materials or contain other contaminants of concern. Interior paint and paint above the waterline should be evaluated according to the practices presented under the PCB and Debris sections when appropriate. If paint is found to contain PCBs, then the protocols found in the "PCB" section of this document should be followed. If paint exhibits physical damage such as blistering, peeling, or pitting that contributes to vessel debris (such as paint chips or flakes) that might float or could be transported into the water column during a sinking event, then the protocols under the "Solids/debris/floatables" section of this document should be followed. Exfoliating paint (paint that is blistering, peeling, and pitting) and exfoliated paint (paint chips and flakes) should be removed.

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SOLIDS/DEBRIS/FLOATABLES

Narrative Clean-up Goal: Remove loose debris, including materials or equipment not permanently attached to the vessel, which could be transported into the water column during a sinking event.

Environmental Impacts

Marine debris consists of solid materials of human origin discarded at sea. Floatable material/debris is any unsecured foreign matter that floats, remains suspended in the water column, or washes up on shore. Floatable materials can travel long distances in the ocean and be deposited far from their source.

The degradability of floatable materials and marine debris influences the persistence of these items in the marine environment. Most marine debris is man-made and does not biodegrade readily. The longer that introduced materials remain in the marine environment, the greater the threat they pose to the environment.

Some potential impacts of solids/debris/floatables to the marine environment include:

- Marine life is endangered by entanglement, ingestion, or both; injury, infection, and death may often occur when marine animals encounter debris of this nature;
- Alteration of the ecosystem and its processes may occur throughout the water column as a result of debris introduced into the marine environment. For example, floating debris may act as an attractant for marine animals that would try to use it as shelter or a food source, thereby potentially causing injury or death and altering behavior and/or distribution of indigenous species. Debris settling on the bottom would change benthic floral and faunal habitat structure, potentially causing a direct deleterious impact on members of the benthic community (i.e., injury or mortality) or indirect impact to other species linked in the benthic food web;
- Recurring clean-up costs for coastal communities impacted by the debris; and
- Danger to navigation (e.g., hull damage, damage to propellers, and damage to cooling and propulsion systems).

What are solids/debris/floatables?

Solids, debris, and floatables are loose materials that could break free from the vessel during transportation and placement as an artificial reef, thereby adversely affecting the ecological or aesthetic value of the marine environment or posing a risk to humans or animals (i.e., land animals). These materials can consist of vessel debris, introduced debris, and clean-up debris. Vessel debris refers to material that was once part of the vessel or was generated during vessel clean-up operations and has been removed or disconnected from its original location on the vessel. Clean-up related debris is material that was not a part of the vessel, but rather was brought on the vessel during preparation operations.

Where are solids/debris/floatables found on ships?

Solids, debris, and floatables can be found anywhere within the vessel as well as on the decks.

Vessel Preparation**Vessel Debris**

All material or equipment that is not an integral part of a permanently attached appurtenance and that could become separated from the vessel during sinking should be removed from the ship prior to sinking. Ship's surfaces (e.g., decks, bulkheads, overheads, and surfaces of appurtenances) should be thoroughly cleaned to remove all dirt, loose scale, trash, exfoliating paint, paint chips, hazardous materials, and other foreign matter. Deck drains should be proven clear of debris.

When assessing vessel debris removal, consideration should be given to the following:

- no vessel debris contaminated with hydrocarbons or hazardous material should remain in the vessel;
- vessel debris that is heavy and/or bulky fitted equipment, and was disconnected or otherwise detached from the structure of the vessel for cleaning or inspection can remain in its original compartment subject to issues of diver safety. Otherwise, vessel debris should be contained in a sealed compartment or structural tank that is below the waterline of the ship and underneath the largest section of the superstructure;
- vessel debris should not be placed in a compartment or structural tank that will be sealed until both the compartment and the debris have been inspected; and
- vessel debris remaining on the vessel should always be negatively buoyant.

Any vessel debris determined to be acceptable to remain on the vessel for sinking should be clean in the context of this guidance.

Clean-up Related Debris

Clean-up debris that was introduced to the vessel solely for cleaning purposes and final preparation of the vessel should always be removed. This would include items such as tools, generators, warning tape, and temporary wooden covers.

Introduced Debris

Foreign material placed on the vessel solely for disposal is not acceptable. However, introduced material of a permanent or commemorative nature (e.g., plaques, markers, clean concrete, or rock for ballast) is permissible.

OTHER MATERIALS OF ENVIRONMENTAL CONCERN

Narrative Clean-up Goal: Remove other materials that may negatively impact the biological, physical, or chemical characteristics of the marine environment.

Environmental Impacts

When placed in the marine environment, materials of environmental concern can have adverse effects on fish, wildlife, shellfish, recreation, or municipal water supplies. Adverse effects on the environment include any of the impacts mentioned in the preceding sections of the document. The magnitude of the impact of these materials on the marine environment will be related to the nature of the material, the level of toxicity, and the ecological resources that could come in contact with “other material of environmental concern.”

What are other materials of environmental concern?

Refer to the list provided below.

Where are other materials of environmental concern found on ships?

Other materials of environmental concern can be found anywhere within the vessel as well as on the decks.

Vessel Preparation

Shipboard equipment or materials with constituents that can leach into the water column (e.g., petroleum products, batteries, and/or mercury containing switches) should be removed from the vessel prior to sinking. Fluorescent light tubes and ballasts should be removed. Waste water resulting from clean-up processes, including but not limited to decontamination, rain water collection, and water from rinsing of tanks and lines, should be properly collected and disposed.

Antifreeze and Coolants

Antifreeze and coolant mediums, other than untreated sea water, should be drained and removed from the vessel and the equipment should be flushed.

Batteries

All batteries should be removed from the vessel. This includes batteries that are part of fitted equipment.

Fire Extinguishing Systems

Fire extinguishing systems should be fully decommissioned. Except for fire-fighting systems that employ untreated seawater or fresh water, all fire-fighting compounds should be removed from the ship. Storage containers, if left *in situ*, should be cleaned, flushed, and re-closed for
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transit. Any lines that have been charged with any fire-fighting product other than untreated seawater or fresh water should be treated as for fuel and oil piping.

Refrigerants and Halons

All refrigerants and halons should be removed from the vessel.

Mercury

Ship system components using mercury (e.g., some gyroscopes, vacuum measurement gauges, some laboratory equipment, some light switches, some older radar displays) should be removed from the vessel. All portable thermometers and other measuring equipment employing mercury should be removed intact from the vessel. Any other extent mercury or items containing mercury should be removed from the vessel. Note that there is a health hazard associated with airborne mercury.

Lead

Lead ballast bars, shielding and fittings should be removed from the vessel if the reef site is located in fresh or brackish water.

Black and Gray Water

Remove black water (sewerage) and gray water (waste water from sinks, showers, galleys, dishwashers) from the vessel; flush the lines.

Radioactive Materials

Ex-warships, research vessels, and a few other types of vessels may have used equipment containing low-level radioactive material. Residual radioactivity and any source of non-naturally occurring radioactive materials such as luminescent devices should be removed if determined appropriate. The Navy is more familiar with addressing this material aboard vessels, and as such, the Navy has guidance and established procedures regarding the removal and disposal of radioactive materials. For this reason, it is recommended that the procedures for removal and disposal of radioactive materials follow that provided in DLA INST 4145.8, "Material Management for Radioactive Items in the DoD" and implementing instructions. Another reference that may be useful is the American National Standard Institute's standard N13.12-1999, "Surface and Volumetric Radioactivity Standards for Clearance." This document contains tables of surface contamination criteria developed to allow users of radioactive material to demonstrate that the material or equipment can be safely released with no further regulatory control.

Invasive Species

Assess the presence of invasive species that could be transported to and survive at the artificial reef location on the hull of the ship or from other locations on or in the vessel such as ballast and bilge tanks. If a viable invasive species is found that may be expected to survive at the artificial reef site, that species should be removed or eliminated; the vessel should be clean of all such living organisms.

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Considerations for Other In-water Uses of Obsolete Vessels

DIVING OPPORTUNITIES

The narrative goals set out under the section “Guidance for Preparing Vessels to Create Artificial Reef Habitat” also should be achieved while preparing a vessel for diver opportunities. For example, if preparation for diver use calls for the removal of wall paneling that will in turn expose any materials of concern that were identified in the aforementioned section, the respective narrative goals should be addressed (e.g. if asbestos is exposed once the panel is removed, the objectives of the asbestos narrative goal should be met).

Additional vessel preparation to support the in-water use of recreational diving may include:

- Removal of sharp and protruding objects along the divers' access path which could snag on divers' equipment or otherwise pose a danger to the divers.
- Removal of doors and access hatches and widening of openings to allow safe access for divers.
- Widening of corridors by removal of some wall paneling and provision of large openings in the exterior of the ship to allow light to penetrate and ensure safe diver access.
- Sealing entrances into restrictive compartments such as the boiler rooms and engine rooms to ensure diver safety.

When preparing the vessel for diver opportunities, careful consideration also should be given to vessel stability (for transport and sinking operations) as well as vessel integrity (for the life of the vessel once placed at the reef site).

BREAKWATERS/BARRIERS

Although the best management practices (BMPs) presented in this document are intended for use in preparing ships for artificial reef habitat, they are also applicable to in-water uses of vessels such as breakwaters or other types of barriers. It is recommended that the BMPs be used for preparing a vessel to serve as a breakwater; however, additional vessel preparations are most likely necessary. Placement of a vessel in a high energy environment (e.g., where there is significant wave, current, or tidal action) would likely result in more rapid degradation of a vessel structure than if placed at typical reef locations. If ships are to be placed in high intensity/energy environments, additional vessel preparation measures will be necessary.

Each project should be analyzed to determine what additional preparations are necessary beyond those recommended for preparing vessels to serve as reef habitat. For example, non-friable asbestos and intact/undisturbed or sealed friable asbestos deemed acceptable to remain on the vessel if used as reef habitat may need to be removed to prevent any release of asbestos that may occur when placed in a persistently high energy environment. For the same reason, it may also be necessary to remove negatively buoyant vessel debris as well as some affixed ship components and fixtures.

Water depth at a breakwater site may critically affect a vessel's stability and long-term structural integrity. In this case, average wave energy in large, open bodies of water as a function of water depth is the major concern. The vessel itself may break apart over time if placed in a high energy wave environment.

Wave interaction with a vessel serving as a breakwater can be destructive; however, the magnitude of such destruction to the vessel is difficult to predict. The wave interaction is primarily dependent on wave height, wave speed, depth of the breakwater, as well as the composition and configuration of the "vessel" breakwater itself. Wave energy can resuspend bottom sediments, causing siltation on the vessel or destabilization of the vessel's structure which could in turn move short distances or entirely off the original breakwater site. Planning for worst-case storms may be required at breakwater sites where movement of the vessel would be detrimental to various ecosystem components.

Appendix A

National Defense Authorization Act for Fiscal Year 2004

The National Defense Authorization Act for Fiscal Year 2004 (PL 108-136) included two provisions relating to the use of vessels as artificial reefs. One such provision, § 3516 (PL 108-136, Div. C, Title XXXV, § 3516, Nov. 24, 2003, 117 Stat. 1795), amended the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (PL 107-314, Div. C, Title XXXV, § 3504(b), Dec. 2, 2002, 116 Stat. 2754; 16 U.S.C. 1220 note) to read in pertinent part as follows:

Title XXXV – Maritime Administration

Subtitle A – Maritime Administration Reauthorization

***Section 3516. AUTHORITY TO CONVEY OBSOLETE VESSELS
TO UNITED STATES TERRITORIES AND FOREIGN
COUNTRIES FOR REEFING***

(b) Environmental Best Management Practices for Preparing Vessels for Use as Artificial Reefs.—

(1) Not later than March 31, 2004, the Secretary of Transportation, acting through the Maritime Administration, and the Administrator of the Environmental Protection Agency shall jointly develop guidance recommending environmental best management practices to be used in the preparation of vessels for use as artificial reefs.

(2) The guidance recommending environmental best management practices under paragraph (1) shall be developed in consultation with the heads of other Federal agencies, and State agencies, having an interest in the use of vessels as artificial reefs.

(3) The environmental best management practices under paragraph (1) shall --

(A) include recommended practices for the preparation of vessels for use as artificial reefs to ensure that vessels so prepared will be environmentally sound in their use as artificial reefs;

(B) promote consistent use of such practices nationwide;

(C) provide a basis for estimating the costs associated with the preparation of vessels for use as artificial reefs; and

(D) include mechanisms to enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels.

(4) The environmental best management practices developed under paragraph (1) shall serve as national guidance for Federal agencies for the preparation of vessels for use as artificial reefs.

(5) Not later than March 31, 2004, the Secretary of Transportation, acting through the Maritime Administration, and the Administrator of the Environmental Protection Agency shall jointly establish an application process for governments of States, commonwealths, and United States territories and possessions, and foreign governments, for the preparation of vessels for use as artificial reefs, including documentation and certification requirements for that application process.

(6) The Secretary of Transportation shall submit to Congress a report on the environmental best management practices developed under paragraph (1) through the existing ship disposal reporting requirements in section 3502 of Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (as enacted into law by Public Law 106-398; 1654A-492) [Pub.L. 106-398, Div. C, Title XXXV, § 3502, Oct. 30, 2000, 114 Stat. 1654A-492, which is not classified to the Code]. The report shall describe such practices, and may include such other matters as the Secretary considers appropriate.

The second such provision, § 1013 (PL 108-136, Div. A, Title X, § 1013, Nov. 24, 2003, 117 Stat. 1590), amended Title 10 of the United States Code by adding section § 7306b. New § 7306b (a) authorizes the Secretary of the Navy to transfer vessels stricken from the Naval Vessel Register for use as an artificial reef. New § 7306b (c) requires the Secretary of the Navy to ensure that the preparation of a vessel transferred pursuant to 10 U.S.C. § 7306b (a) for use as an artificial reef is conducted in accordance with the environmental best management practices developed pursuant to 16 U.S.C. § 1220 note and applicable environmental laws. The complete text of Section 1013 of the National Defense Authorization Act for Fiscal Year 2004 is as follows:

Title X – General Provisions

Subtitle B – Naval Vessels and Shipyards

***Section 1013. TRANSFER OF VESSELS STRICKEN FROM THE
NAVAL VESSEL REGISTER FOR USE AS ARTIFICIAL REEFS.***

(a) AUTHORITY TO MAKE TRANSFER- Chapter 633 of title 10, United States Code, is amended by inserting after section 7306a the following new section:

Sec. 7306b. Vessels stricken from Naval Vessel Register: transfer by gift or otherwise for use as artificial reefs

“(a) AUTHORITY TO MAKE TRANSFER- The Secretary of the Navy may transfer, by gift or otherwise, any vessel stricken from the Naval Vessel Register to any State, Commonwealth, or possession of the United States, or any municipal corporation or political subdivision thereof, for use as provided in subsection (b).

`(b) VESSEL TO BE USED AS ARTIFICIAL REEF- An agreement for the transfer of a vessel under subsection (a) shall require that--

`(1) the recipient use, site, construct, monitor, and manage the vessel only as an artificial reef in accordance with the requirements of the National Fishing Enhancement Act of 1984 (33 U.S.C. 2101 et seq.), except that the recipient may use the artificial reef to enhance diving opportunities if that use does not have an adverse effect on fishery resources (as that term is defined in section 2(14) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1802(14)); and

`(2) the recipient obtain, and bear all responsibility for complying with, applicable Federal, State, interstate, and local permits for using, siting, constructing, monitoring, and managing the vessel as an artificial reef.

`(c) PREPARATION OF VESSEL FOR USE AS ARTIFICIAL REEF- The Secretary shall ensure that the preparation of a vessel transferred under subsection (a) for use as an artificial reef is conducted in accordance with--

`(1) the environmental best management practices developed pursuant to section 3504(b) of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314; 16 U.S.C. 1220 note); and

`(2) any applicable environmental laws.

`(d) COST SHARING- The Secretary may share with the recipient of a vessel transferred under subsection (a) any costs associated with transferring the vessel under that subsection, including costs of the preparation of the vessel under subsection (c).

`(e) NO LIMITATION ON NUMBER OF VESSELS TRANSFERABLE TO PARTICULAR RECIPIENT- A State, Commonwealth, or possession of the United States, or any municipal corporation or political subdivision thereof, may be the recipient of more than one vessel transferred under subsection (a).

`(f) ADDITIONAL TERMS AND CONDITIONS- The Secretary may require such additional terms and conditions in connection with a transfer authorized by subsection (a) as the Secretary considers appropriate.

`(g) CONSTRUCTION- Nothing in this section shall be construed to establish a preference for the use as artificial reefs of vessels stricken from the Naval Vessel Register in lieu of other authorized uses of such vessels, including the domestic scrapping of such vessels, or other disposals of such vessels, under this chapter or other applicable authority.'

(b) CLERICAL AMENDMENT- The table of sections at the beginning of such chapter is amended by inserting after the item relating to section 7306a the following new item:

`7306b. Vessels stricken from Naval Vessel Register: transfer by gift or otherwise for use as artificial reefs. ' .

Appendix B

Some Legal Authorities that may Apply to Vessel-to-Reef Projects

This appendix identifies certain statutes, regulations, and executive orders that may apply to artificial reef projects. It is not an exhaustive list.

Clean Water Act ' 404 (33 U.S.C. 1344)

Placement of fill material (including structures such as those used to create artificial reefs) in inland waters and the territorial sea require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (Corps). In issuing these permits, the Corps must determine that the permit would not cause or contribute to violations of applicable water quality standards or cause or contribute to significant degradation of waters of the United States. EPA may prohibit, withdraw, or restrict the use of a site if EPA determines that the placement of the artificial reef will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas.

Clean Water Act ' 401 (33 U.S.C. 1341)

Under Section 401 of the Clean Water Act, Section 404 permits for proposed discharges of dredged or fill material are subject to State certification as to compliance with applicable State water quality standards. No such permit may be issued unless State certification is obtained or is waived under Section 401.

Rivers and Harbors Act of 1866 ' 10 (33 U.S.C. 403)

Section 10 of the Rivers and Harbors Act (RHA) requires a permit from the U.S. Army Corps of Engineers for the construction of any structure (including artificial reefs) in or over any “navigable water of the United States” (see 33 CFR Part 329), the excavation from or deposition of material in such waters, or any obstruction or alteration in a navigable waters of the United States. Structures or work outside the limits of navigable waters of the United States also require a Section 10 permit if the structure or work affects the course, location, or condition of the waterbody in such a manner as to impact on its navigable capacity. Under the Outer Continental Shelf Lands Act (43 U.S.C. 1333(e)), Section 10 permit requirements also apply to the creation of structures on the Outer Continental Shelf of the United States, including artificial reefs. 33 C.F.R. 322.(3)(b).

Liberty Ship Act (16 U.S.C. ' ' 1220, et seq.)

This Act allows States to apply to the Secretary of the Department of Transportation (DOT) for the use of DOT owned obsolete vessels as an artificial reef for the conservation of marine life. This Act requires that the State application to DOT include a certification from EPA that the proposed use of the vessel will be compatible with “applicable water quality standards and other appropriate environmental protection requirements” (16 U.S.C. ' ' 1220 (b)).

National Fishing Enhancement Act of 1984 (33 U.S.C. ' ' 2101, et seq.)

This Act applies to artificial reefs in waters of the United States or on the Outer Continental Shelf for the purpose of enhancing fishery resources. The Act obligates NOAA to issue a national artificial reef plan that addresses issues such as siting and design criteria. This Act also amends the Liberty Ship Act by moving responsibility for Liberty Ships from the Department of

Commerce to the Department of Transportation, as well as moving responsibility of all obsolete vessels owned by the Department of Transportation to States that apply for and acquire them. In addition, this Act establishes further requirements to be applied by the Corps in the exercise of its permitting authority over artificial reefs.

Coastal Zone Management Act of 1972 (16 U.S.C. ' ' 1452, et seq.)

The Coastal Zone Management Act establishes a Federal/State partnership to provide for the comprehensive management of coastal resources. States develop management programs based on enforceable policies and mechanisms to balance resources protection and coastal development needs. The Federal consistency provisions require that all Federal activities (including direct Federal actions and Federal financial assistance to state and local governments) be consistent to the maximum extent practicable with the enforceable policies of a state's Federally-approved coastal management program. Any applicant for a Federal license or permit must be consistent with the enforceable policies of a State's coastal management program.

Toxic Substance Control Act (15 U.S.C. ' ' 2601, et seq.)

The Toxic Substance Control Act bans the manufacture, processing, use, and distribution in commerce of PCBs and directs the EPA to set regulations for the disposal of PCBs. The PCB program has historically used a limit of ≥ 50 ppm for the disposal of PCBs. PCBs ≥ 50 ppm are regulated for disposal at 40 CFR 761. The sinking of ships containing PCBs at regulated levels (≥ 50 ppm) is considered PCB disposal and requires approval under §761.62(c) from the U.S. EPA. PCBs may be found in a variety of shipboard materials but the location and concentration may vary from item to item and within classes of items. There are two ways to determine regulatory status of items suspected to contain PCBs: 1) assume "worst case" (≥ 50 ppm) and remove the suspect item(s), or 2) sample and analyze the items for PCB concentration.

Federal Insecticide, Fungicide, and Rodenticide Act Amendments of 1988 (7 U.S.C. 136-1367)

EPA has used its authority under FIFRA to regulate antifoulant paints, including those containing organotins, copper, and other compounds. Such paints which make antifoulant claims are pesticides under FIFRA. As part of the partial conclusion of the TBT Special Review, EPA used its FIFRA authority to impose requirements, such as certification and training for applications and other label requirements dealing with TBT applications and disposal.

Organotin Antifouling Paint Control Act of 1988 (33 U.S.C. 2401-2410)

Organotin-based antifoulant systems are also regulated pursuant to OAPCA, which presently prohibits use of organotin-antifouling paints on vessels under 25 meters in length (excluding aluminum hulls, outboard motors, and external drive units), and restricts the leaching rate of organotin antifoulant paints used on larger vessels.

Additional Legal Authorities that may Apply to Vessel-to-Reef Projects

- Endangered Species Act (16 U.S.C. 1531)
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, et seq.)

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| • Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901-2912, et seq.) | | |
| • Marine Mammal Protection Act of 1972 (16 U.S.C. 1361, 1371-1384 note, 1386-1389, 1401-1407, 1411-1418, 1421-1421h) | | |
| • Migratory Bird Conservation Act (16 U.S.C. 715-715r) | | |
| • National Marine Sanctuaries Act (16 U.S.C. 1431, et seq.) | | |

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| • Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) | | |
| • National Environmental Policy Act of 1969 (42 U.S.C. 4321, 4331-4335, 4341-4347) | | |
| • National Marine Sanctuary Program Regulations (15 C.F.R. Part 922) | | |

Some Executive Orders that may Apply to Vessel-to-Reef Projects

- | | |
|---|---|
| • Executive Order Number 12962 (60 FR 30769) - Recreational Fisheries | • Executive Order Number 11990 (42 FR 26961) - Protection of Wetlands |
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Appendix C

Information related to materials found on scuttled vessels that may have potentially hazardous effects on the marine environment*

*The text provided in this appendix is an excerpt from the 2003 “*Draft Policy Statement of the National Marine Sanctuary Program: Artificial Reef Permitting Guidelines.*”

Scuttled Vessels

The scuttling of vessels requires particular attention in this policy because of their size and potential toxicological effects on the environment. As discussed above, sunken ships potentially attract divers away from natural reefs and thus may be beneficial to natural reefs in NMSs. However, there is a wide array of concerns that must be addressed before intentionally sinking a ship.

The removal of petroleum products, hazardous materials, paint cans, batteries, plastics, oil, and fuel is specified on the U.S. Coast Guard’s Ocean Disposal/Artificial Reef Inspection form. Additionally, under the Toxic Substances Control Act (TSCA), the EPA has the authority to gather information on and regulate chemical substances and mixtures imminently hazardous or presenting unreasonable risk of injury to public health or the environment. Despite these controls, some materials of concern may still remain on items used as artificial reef material. Such materials include: asbestos, polychlorinated biphenols (PCBs), iron, lead paint, and antifouling paint. The NMSP should consider the risks associated with materials remaining on vessels to be used as artificial reefs.

Asbestos is the name given to six naturally occurring minerals that are used as insulators and fire retardants. Several studies have investigated the effects of asbestos on fish (Batterman and Cook 1981, Belanger *et al.* 1990, Belanger *et al.* 1986, Woodhead *et al.* 1983). The findings indicate that asbestos concentrations on the order of 10⁶ to 10⁸ fibers/L may cause epidermal lesions, epithelial hypertrophy, kidney damage, decreased orientation and swimming ability, degradation of the lateral line, reduced growth, and increased mortality in fish. Undisturbed, non-friable (not easily crumbled) asbestos has been found to be relatively harmless (Garcia and Salzwedel 1995, Montoya *et al.* 1985).

PCBs may still exist in water-tight gaskets, cable insulation, paint, transformers, capacitors, and other components of decommissioned Navy vessels (Matore *et al.* 1996, Eisler and Belisle 1996). These chemicals have been implicated in: reduced primary productivity in phytoplankton; reduced hatchability of contaminated fish and bird eggs; reproductive failure in seals; altered steroid levels and subsequent reproductive impairment in fish and sea stars; reduced fertilization efficiency in sea urchins; and reduced plasma retinal and thyroid hormone levels potentially leading to increased susceptibility to microbial infections, reproductive disorders and other pathological alternation in seals and other marine mammals (Adams and Slaughter-Williams 1988, Brouwer *et al.* 1989, Clark 1992, den Besten *et al.* 1991).

Antifouling paints typically containing tributyltin (TBT) and copper (Cu) are often used to paint vessel hulls to inhibit the growth of organisms below the water line. An IMO convention to control the use of harmful anti-fouling systems on ships was adopted on October 5, 2001. The convention will prohibit the use of harmful organotins, including TBT, in anti-fouling paints

June 24, 2004

used on ships and establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems. TBT has been found to be toxic to non-target, non-fouling organisms at low levels (approximately 7.5-10.5 ng TBT/L). One of its most marked effects has been the induction of shell thickening and growth anomalies in oysters and imposex² in the dogwhelk *Nucella lapillus* potentially leading to sterility (Gibbs *et al.* 1998). The discovery of the highly toxic nature of TBT-based paints has led many countries to ban the use of these paints for non-aluminum hulled vessels less than 25 meters in length. Copper, though an effective antifoulant, has not been shown to cause extensive effects on non-target organisms at relatively low levels. When present in high concentrations, however, copper can be toxic to aquatic life (Sorrenson 1991). In a study conducted when a cargo ship collided with part of the Great Barrier Reef and remained grounded for 12 days, sediment containing 8.0 mg kg super(-1) TBT, 72 mg kg super(-1) Cu and 92 mg kg super(-1) Zn was found to significantly inhibit larval settlement and metamorphosis (Negri *et al.* 2002). At this level of contamination, larvae survived but contracted to a spherical shape and swimming and searching behavior ceased. At higher contamination levels, 100% mortality was recorded. These results indicate that the contamination of sediment by anti-fouling paint has the potential to significantly reduce coral recruitment in the immediate vicinity of the site and that this contamination may threaten the recovery of the resident coral community unless the paint is removed.

Iron, an essential element like copper, can be contributed to the environment from steel hulls of sunken vessels. As an essential element, iron levels will tend to be closely regulated by organisms, and thus, it is unlikely that any pollution-derived effects will be observed except in severe and localized cases (Thompson 1990). Corals living in seawater with high iron concentrations have been shown to incorporate the iron into their skeletons (Brown *et al.* 1991). Studies on phytoplankton and macroalgae indicate that in areas where plant nutrients such as nitrate and phosphate are abundant the availability of iron is actually a limiting factor in growth and biomass (Coale *et al.* 1996, Frost 1996, Matsunaga *et al.* 1994, Takeda 1998, Wells *et al.* 1995). Hence the concern of unnatural iron inputs from artificial reefs seems to center not on the occurrence of adverse toxicological effects in marine organisms, but rather on the alteration of the composition of natural assemblages of algae and species which compete with algae.

Lead paint has been used on the interiors of some vessels. Lead has no biological function and, therefore, exhibits accumulation trends in organisms (Thompson 1990). Corals have been shown to incorporate lead into their skeletons (Dodge and Gilbert 1984). Unicellular algae and sea urchins appear to be the most sensitive marine organisms (Berhard 1980). Growth inhibition has been observed in the algae species *Thalassiosira pseudonana* and *Porphyridium marinum* exposed to lead as well as in sea urchins.

Despite the potential toxicological effects of the chemicals discussed above, adverse effects will not occur unless the chemicals are present at or above their effective concentrations. The South Carolina Department of Natural Resources completed an assessment in the mid-1990s on the levels of PCB and heavy metals in biota found on ex-military ships used as artificial reefs. Over 100 samples were collected from locations along the South Carolina coast. Of the 80 tissue samples analyzed for PCBs, only 19 were found to contain concentrations above the 100 ppb weight wet limit of quantitation and all were well below the U.S. Food and Drug Administration's alert action level of 2000 ppb weight wet. (Note that being below safe levels for human consumption does not necessarily mean there are no adverse effects on the marine

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organism itself.) No significant differences were detected in the tissues of organisms collected from vessels known to contain PCB-laden materials, vessels suspected to have PCB-laden materials, and natural hard bottom control sites. Although some of the collected samples were moderately high in a particular heavy metal, no clear correlation was found between high metal levels and a particular type of sample site. Gastropods, however, did contain much higher levels of lead, possibly attributed to the fact that they would graze directly on the painted surfaces. South Carolina concluded that the PCB and metal levels detected in the study did not indicate increased hazards around military ships used as artificial reefs.

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Appendix D

Developing Workplans for Vessel Preparation Prior to Reefing

Determining the type and location of the potential sources of contamination from a vessel intended for use as an artificial reef should be conducted as part of a workplan for vessel clean up and preparation. The purpose of such a workplan is to assure that materials of concern potentially contributing to pollution of the marine environment are addressed prior to reefing. The development of a workplan also can allow for more effective clean-up efforts during vessel preparation by guiding activities such as salvage operations and possibly diver safety preparations in a manner that minimizes debris and contamination that must be cleaned up or properly disposed.

Information which may be useful in the preparation of a workplan could include:

- Asbestos documentation for the vessel;
- PCB documentation for the vessel;
- Documentation that naval vessels have been previously demilitarized and certified to be radiologically decontaminated;
- Documentation that refrigerants and halons have been removed from shipboard systems;
- Information on hazardous materials onboard the vessel;
- Information on exterior hull paint which could include paint type and date of last application;
- General drawings of machinery, compartments, and tank layouts;
- Description of vessel dimensions including size, weight, and superstructure materials;
- Tank soundings describing the volume and contents of fuel oil tanks prior to preparation for reefing;
- List of items with beneficial reuse potential to be salvaged prior to sinking;
- Assessment of applicable laws and regulations, including permit requirements; and
- Reef site surveys and proposed site preparation.

An assessment of the above mentioned information could then direct the preparation actions needed for the reef project workplan. Some general workplan actions include:

- Assess vessel drawings and dimensions;
- Identify which items will remain on the vessel;
- Identify items to be salvaged prior to sinking;
- Estimate economic viability of the reef project (including permit costs and timeframes);
- Determine if the vessel is a good candidate (i.e., does the workplan fall within reasonable time and financial commitments);
- Coordinate with all regulatory agencies, local, regional, State and Federal, as well as stakeholders, during all project phases;
- Apply for and receive the appropriate permits for the project;
- Remove hazardous materials and clean vessel;

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- Inspect vessel to clear all findings (that the workplan for removal of materials as well as the vessel clean-up is met);
- Conduct vessel stability analysis;
- Develop strategy for vessel sinking;
- Notify NOAA to update nautical charts once the ship has settled on the ocean floor; and
- Deploy relevant aids to navigation and mooring/marker buoys at the site.

Appendix E

General Principles for a Vessel Clean-up Operation

In order to prepare a vessel intended to create an artificial reef, a workplan should be developed to direct cleaning operations – as described in Appendix D. Salvage operations should take place first, being careful to minimize debris and contamination with oils or other products that will need cleaning sometime during the vessel preparation. Other vessel clean-up preparations to be considered include:

- Re-use/recycle/dispose of all or some vessel components – besides ferrous scrap materials, there may be high value components onboard the vessel, such as non-ferrous metals (e.g., copper, aluminum, nickel), and re-useable equipment such as generators, machines, pumps, and cranes;
- Generally, clean-up operations should begin at the highest part of the compartment or tank and proceed downwards to the bilge;
- Deal with the large concentrations of oil and hazardous products early in the operation;
- Keep compartments clean and make concerted efforts to avoid spillage during salvage and clean-up operations; and
- Consider removing, instead of cleaning, heavily contaminated machinery and piping. Removal may be quicker and less expensive. Removal may also allow for less overall effort in clean-up as access to the contaminated machinery and piping is improved and ongoing contamination from drips and seepage is minimized.

Appendix F

Suggested Cleaning Methods for Liquid Hydrocarbons (fuels, oils) and Semi-solids (greases)

Tanks

Methods for cleaning tanks include but are not limited to:

- Mechanical Cleaning: Mechanical cleaning involves mechanical removal of sludge and remaining fluids and wiping down all surfaces with oil absorbent material. Although manpower intensive, this cleaning method limits the spread of contamination and does not require large volumes of fluids that are expensive to dispose.
- Steam or Hot Water Cleaning: This method is quite effective, although it requires special equipment and generates large volumes of oily water. If this method is considered, a plan should be developed so that oily water generated during this cleaning method is dealt with in accordance with all applicable regulations. Surfactants or soaps are not recommended, as they tend to emulsify any oil present and make the oily water exceptionally difficult to treat. This would likely create higher disposal costs. In tanks where deckheads and sides are reasonably free of contamination, pressure washing can cause significant contamination of these otherwise clean surfaces through splashing, misting, and carry-over.
- Solvent Washing: Solvent washing may be an option where there are especially difficult residuals or deposits that need removal. Note that the use of solvents will require special handling and disposal of all liquid product generated as wastes.

In rare cases, especially where low-grade fuels have been stored, it may be necessary to resort to advanced tank cleaning methods such as ultrasonic or special solvents. It may also be advantageous to use a combination of several different methods, depending on the nature and location of the contamination. In general, mechanical cleaning would be the first method to try, followed by steam/hot water washing, then solvent washing in extremely difficult situations. Whatever method is selected, the effluent and water should be collected and treated. Large volumes will require the services of a pumper truck or barge, while smaller quantities should be collected and stored in drums and removed from the vessel. Caution should be used during all transfer operations to avoid spills. If transferring large quantities of oil or oil contaminated liquid, a boom around the vessel should be used to minimize the extent or spreading of a release.

Fuel and Oil Pipe Fittings, Piping with Manifolds, and Filling Points

Filling points: All filling stations or deck fittings that were used for receiving fuels, oils or other hydrocarbons should be opened and cleaned. Access to the filling stations and deck fittings is necessary to ensure that they are completely drained and free of hydrocarbons. This will typically require access from the bottom and the top.

Fuel and Oil Piping Including Manifolds: Fuel and oil piping (including non-segregated ballast systems) should be drained of all product. The cleaning and opening of pipes

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varies according to the type of product that was contained in the lines. In general, the more viscous the product, the more opening of pipes and cleaning activity will be required. For very viscous products (e.g., No. 6 fuel oil or Bunker C fuel as described in the “Oil and Fuel” section of this document), all piping and fittings should be fully opened for visual inspection.

Vertical piping runs should have all valves completely opened and any blanking flanges or spectacle plates removed for cleaning. Horizontal piping runs should be opened at low spots. Once draining of piping systems is completed, no visual evidence of hydrocarbon weeping should exist at openings.

Fuel and Oil Piping Fittings: Fittings consist of valves, site glasses, coolers, siphon breakers, and filters. A visual examination of internals, or a cut through the lowest point of the fitting may be useful. Where fittings are of complex construction or have more than one oil-tight compartment (as in coolers), then access to all sub-compartments or components may be necessary. No visual evidence of hydrocarbon weeping should exist at openings.

Unless the piping is clearly identified as being part of a non-hydrocarbon system or there is clear evidence to indicate that the system was not part of a hydrocarbon containing system (e.g., seawater piping to coolers, fresh water piping to domestic spaces), it should be assumed that the piping contained hydrocarbons. Fittings should be cleaned, or removed from the vessel.

Bilge Compartments and Piping

All piping that runs through the bilge areas of machinery spaces should be assumed to be contaminated by hydrocarbons until proven otherwise. Piping in bilge spaces should follow the clean-up suggestions as presented in the subsection above entitled “Fuel and Oil Piping Including Manifolds.”

Combustion Engines

Structure:

Remove access panels, explosion doors, handhold doors, maintenance panels, gear covers, bearing covers/retaining plates, as necessary to remove oil. Visible oil should be removed from all internal components. The surrounding and support structure should be made accessible for inspection, especially the area under the engine. At least one main bearing should be opened to determine if the design allows oil to be trapped, thereby indicating whether all bearings should be opened and cleaned.

Fuel System:

All fuel system components should be cleaned or removed from the engine. These include injectors, carburetors, supply, distribution and return lines, filters, pumps, relief valves, pressure regulating mechanisms, governors, and heat exchangers. Removal of these items will prevent fuel seepage from their connections. If these items are to be sunk with the vessel, they should be opened, cleaned, and prepared for inspection.

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Lubricating
Oil System:

Lubricating oil sumps should be drained and opened for cleaning and visual inspection. This may require that additional access openings be made. All lubricating oil piping, both internal and external to the engine, should either be removed or drained. Lubricating oil system components should either be cleaned or removed from the vessel. Internal oil gallery plugs should be removed. Pedestal and thrust bearings should be drained. Engine driven oil pumps should be pulled or cleaned. Engine oil filling and dirty oil drainage arrangements should be removed or cleaned.

Other Systems:

Other components and systems susceptible to contamination with hydrocarbons (e.g., superchargers, turbochargers, air filters) should be examined visually and cleaned if hydrocarbons are present.

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Appendix E

DMG Shipyard Health and Safety Plan

SHIPYARD HEALTH AND SAFETY PLAN

DOMINION MARINE GROUP, LTD.

**425 Campostella Road
Norfolk, VA 23523**

January 7, 2005

Shipyard Health and Safety Plan

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1.1 DMG Environmental, Health and Safety Policy

DMG is committed to business practices, operations, and projects that protect people and the environment.

DMG understands that ship repair and dismantling can be a dangerous endeavor. The basis for our health, safety, and environmental programs is that accidents causing injuries or illness to personnel or impact on the environment are preventable. It is everyone's obligation to prevent accidents, and all personnel are expected to conduct business in a manner that actively integrates the elements of the DMG Health and Safety Program into applicable aspects of DMG shipyard operations.

The goal of the DMG Health and Safety Program is zero accidents; therefore, accident prevention continues to be of paramount importance to the company. To this end, safety takes precedence over expediency.

DMG is committed to compliance with all client health, safety, and environmental requirements as well as to applicable regulations.

DMG has established procedures that provide direction on health and safety matters to all employees. These procedures are periodically evaluated in light of current case law, new regulations, and emerging industry practices.

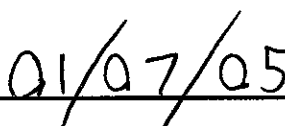
Both management and employees have the responsibility through personal example to create a climate in which everyone shares a concern for his own safety and the safety of his fellow workers.

I certify that I have personally examined and am familiar with the information submitted in this policy document. To the best of my knowledge, the information contained herein is true, accurate and complete.



Tim Mullane

Vice President & Program Manager



Date

1 INTRODUCTION

1.2 Health and Safety Plan Report Organization

This HASP includes those elements as requested by the U.S. Maritime Administration (MARAD) in its requirements for a Technical Compliance Plan. The HASP is presented as follows:

Section 1: presents DMG's EHS policy and the report organization;

Section 2: describes all process control procedures applicable to remediation and dismantlement of the obsolete ship;

Section 3: describes DMG's personnel protection program;

Section 4: describes DMG's Shipyard Security; and

Section 5: discusses DMG's shipyard contingency plans.

2 *PROCESS CONTROL PROCEDURES*

DMG HASP
ISSUE DATE: 01/07/05

This health and safety plan includes evaluation and discussion of the shipyards hazards reasonably anticipated to be encountered during the performance of this project. Hazard analysis and process control procedures in the section include:

- 2.1 Fire Prevention and Protection
- 2.2 Fall Protection
- 2.3 Crane and Rigging Safety
- 2.4 Machine Guarding
- 2.5 Hot Work Procedures
- 2.6 Marine Safety
- 2.7 Confined Spaces
- 2.8 Lead Abatement
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- 2.11 Chromated Water
- 2.12 Mercury
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- 2.14 Wastewater
- 2.15 Handling Fuels, Oils and Lubricants
- 2.16 Tank Cleaning and Gas Free Operations
- 2.17 Waste Management
- 2.18 Housekeeping

Each procedure describes employer and employee responsibilities, its applicability, governing regulations, training, personal protection and personal protective equipment, as well as the requirements to effectively implement the procedure to ensure compliance with all applicable regulations, and successful execution of the project while maintaining a safe work environment. All employees shall be fully training as applicable in these process control procedures, and will fully comply with and understand them as they apply to the remediation and dismantling or preparing ships for reefing. These procedures are incorporated by reference into the Environmental Compliance Plan.

2.1 Fire Prevention and Protection

Employees

- Know the proper local authorities to contact in case of a fire emergency.
- Smoking is not permitted on the site where work is being performed.
- Know the location of fire extinguishers and other fire fighting equipment.
- Know the proper precautions and work procedures when using torches and welding equipment.
- Do not perform any hot work in an area which has not been certified gas-free.

Employer

- Train employees in proper fire fighting procedures. Document this training.
- Notify employees of the local authorities to contact in case of a fire emergency.
- Do not permit smoking on the site where work is being performed.
- Maintain fire extinguishers and other fire fighting equipment properly, wherever hot work is conducted.

2.2.1 Purpose

Fire protection is a science in itself. This EHS program cannot cover all aspects of fire prevention and extinguishment, but this section does present condensed, basic information to help supervise fire-safe operations. This section will help employees:

- understand the basic principles of fire safety;
- identify fire hazards, causes of fires, and safeguards required to prevent fires;
- conduct regular, periodic inspections to ensure that work areas remain in a fire-safe condition;
- understand the use and operation of fire protection equipment and systems; and
- instruct employees in the procedures for reporting fires, fighting fires, and evacuating work areas.

2.2.2 Scope

This section covers all DMG employees. This section complies with 29 CFR Subpart L, 1910.155-1910.165 and 29 CFR 1915.52.

2.2.3 Responsibilities

The Facility Manager is responsible for ensuring that all information in this section is provided to DMG.

2.2.4 Education and Training Requirements

All DMG employees shall be educated on the content of this chapter.

2.2.5 Documentation and Recordkeeping Requirements

Records should be kept of all inspections conducted at the DMG facility. The record should detail what was determined from the inspection; what corrective actions were needed (if any);

2.1 Fire Prevention and Protection

and who was assigned to achieve the actions. Records shall be maintained by DMG for at least 3 years. Refer to the attached fire prevention checklist.

2.2.6 Procedures for Hot Work

Initial Operations

After the initial mooring of a vessel, no personnel shall enter the vessel prior to the inspection of the vessel by a marine chemist unless specifically authorized by the competent person. No smoking or open flames shall be permitted on board during tie up operations, until cutting procedures have been authorized. A competent person shall make a preliminary inspection to authorize personnel to board and begin hatch opening operations. "Competent Person" means that DMG shall ensure that each designated competent person has the following skills and knowledge:

1. Ability to understand and carry out written or oral information or instructions left by Marine Chemist, Coast Guard authorized persons and Certified Industrial Hygienists;
2. Knowledge of 29 CFR 1915;
3. Knowledge of the structure, location, and designation of spaces where work is done;
4. Ability to calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;
5. Ability to perform all required tests and inspections which are or may be performed by a competent person as set forth in 29 CFR 1915;
6. Ability to inspect, test, and evaluate spaces to determine the need for further testing by a Marine Chemist or a Certified Industrial Hygienist; and
7. Ability to maintain records required by this section.

The competent person for Dominion Marine Group is:

Tim A. Fitzgerald, Shipyard Supervisor
Alternate: Tim Mullane, Shipyard Manager (Emergency Phone, 757-675-0301)

During the hatch opening operations, personnel shall work in groups of two or more to test previously closed spaces for oxygen concentration. No personnel shall be permitted to enter these spaces unless the test shows oxygen content to be at least 19.5%.

Torch cutting of windows for the purpose of installing gangways prior to the marine chemist's inspection shall be performed with the specific authorization of the marine chemist. At the completion of the marine chemist's inspection, he/she shall issue a certificate demonstrating the completion of the inspection.

General Operations

Cutting operations shall proceed according to the marine chemist's instructions at the authorization of the competent person as issued to the foreman and/or lead men. A minimum of two water line hoses, not less than 1 ½" in diameter with fog nozzles, shall be fully charged and on board before the commencement of cutting.

2.1 Fire Prevention and Protection

A fire watch shall be kept during cutting operations and for a minimum period of one hour after all cutting operations cease. A fire permit from the Norfolk Fire Department shall be obtained before any hot work is started. A visual inspection of the torches and torch hoses shall be made at the beginning of every shift and after every lunch break, with necessary repairs being made. Fire lines shall be visually inspected and tested at the beginning of each shift. All damage to the fire lines shall be repaired or the hose shall be replaced as soon as damage is noted. All hoses shall be pressure-tested and dated. Fire fighting training shall be held monthly and documented by the Safety Environmental Director.

End of Day Operations

Aboard ship, all gas hoses shall be moved to the existing deck and neatly coiled, with the gas turned off at the manifold. In the yard, all gas hoses shall be neatly coiled at the manifold and the supply valves closed.

2.2.7 Basic Principles

Fire is an oxidation process that emits light and heat. To sustain most fires, four elements must be available at the same time: elevated temperature, oxygen, fuel, and an uninhibited chain reaction. Fire extinguishing agents act by removing one or more of the elements.

Fire spreads from ignition source to a fuel source and to other fuel sources by conduction, convection, and radiation. Conduction transfers heat through contact with solid material. Convection transfers heat through heated air. Radiation heat transfers heat through electromagnetic waves given off by flames.

Continuous training in the fire-safe work procedures, regular inspection of work areas, and close supervision of employees job performance are the primary requirements of a successful fire prevention program.

2.2.8 Understanding Fire Chemistry

Every ordinary fire (one that does not produce its own oxygen supply) results when a substance (fuel) in the presence of air (oxygen) is heated to a critical temperature, called its “ignition temperature”. Knowing this basic concept, we can understand how most fires are extinguished. The methods used include:

Oxygen Removal

Removing or lowering oxygen levels is difficult because a fire needs about the same amount of oxygen for burning (percentage of oxygen in the air) that humans need for breathing. Firefighting foam extinguishes fires by smothering (and cooling) action.

2.1 Fire Prevention and Protection

Fuel Removal

In many cases, it is neither possible nor practical to remove all fuels (solids and liquids). However, try to keep the quantity of stored combustible materials at a minimum. Good housekeeping, with the frequent removal of waste materials, is also a crucial factor in keeping a small, accidental fire from rapidly spreading.

Heat Source Control

Eliminating and controlling the sources are elementary steps in fire prevention. The time to stop a fire is before it starts—keep heat and ignition sources away from fuel.

To extinguish a fire, the following steps should be taken:

1. Reduce or remove the oxygen by smothering (for example, by shutting the lid over a tank of burning solvent or by covering it with foam) or by dilution (replacing the air with an inert gas such as carbon dioxide).
2. Remove or seal off the fuel by mechanical means, or divert or shut off the flow of liquids or gases fueling the fire.
3. Cool the burning material below its ignition point with a suitable cooling agent (hose streams of water extinguishers).
4. Interrupt the chemical chain reaction of the fire (using dry chemical or halon extinguishing agents).

Causes of Fire

When inspecting the workplace the following areas should carefully be reviewed:

Electrical Equipment

Haphazard wiring, poor connections, and temporary repairs must be brought up to standard. Cleaning electrical equipment with solvents can be hazardous because many solvents are flammable and toxic.

Friction

The friction generated by overhead transmission bearings and shafting—where dust and lint accumulate in locations such as elevators are frequent sources of ignition.

Flammable Liquids

A spark or minor source of ignition, which might otherwise be harmless, can start a fire or touch off explosive forces when flammable vapors, evaporated from liquids and then mixed with air, are present. The following should be followed to ensure safe handling of these materials:

- Flammable liquids should be stored in, and dispensed from, approved safety containers equipped with vapor-tight, self-closing caps and covers.
- Flammable liquids should be used only in rooms or areas having adequate and, if possible, positive ventilation.

The following safeguards may be required:

2.1 Fire Prevention and Protection

- An approved flammable liquids storage vault or room
- Special explosion-proof fixtures and equipment
- Automatic suppression system
- Explosive-relief devices and panels
- Self-closing faucets and safety vents for drums
- Flammable liquid storage cabinets
- Safety cans
- Special ventilating equipment

Ordinary Combustibles

Paper and wood products are often referred to as ordinary combustibles. Rack storage and solid pile storage of those materials tend to provide conditions that promote fire growth. Materials that are stacked above one another provide good flue spaces while blocking sprinkler water patterns, thus acting to spread the fire. A flue space is an area that provides for air movement thus increasing the speed at which a fire can grow.

Smoking

Smoking and no-smoking areas must be clearly defined and marked off with conspicuous signs. Fire-safe, metal containers should be provided in places where smoking is permitted.

Smoking is not permitted in the work place.

Static Electricity

Sparks due to static electricity may be a hazard whenever flammable vapors or gases exist. Precautions against static electricity are required in such areas. Static charges can be produced in many ways—for example, by the flow of gasoline through a non-conductive hose, or through the friction of machine parts.

Although it is impossible to prevent the generation of static electricity, the hazard of static sparks can be avoided by preventing the build-up of static charges. Machines should be grounded where the potential for static electricity exists.

Welding, Cutting, and Heating

When practical, employees shall move objects to be welded, cut or heated to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards including residues of combustible bulk cargoes in the vicinity shall be taken to a safe place. If the object to be welded, cut or heated cannot be moved and if all the fire hazards including combustible cargoes cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them. When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed. In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as

2.1 Fire Prevention and Protection

during the lunch hour. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from confined spaces when they are disconnected from the torch or other gas consuming device. Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. Personnel assigned to contain fires within controllable limits shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used.

2.2.9 Effective Housekeeping for Fire Safety

Good housekeeping is another important part of this fire protection program. Here are the precautions to take:

- Combustible materials should be present in work areas only in quantities required for the job.
- Quick-burning and flammable materials should be stored in designated locations.
- Vessels or pipes containing flammable liquids must be airtight.
- Passageways and fire doors should be unobstructed. Stairwell doors must never be propped open, and material should never be stored in the stairwells.
- Materials must never block automatic sprinklers or be piled around fire extinguisher locations or sprinkler and standpipe controls.

To obtain proper distribution of water, a minimum of 18 inches of clear space is required below sprinkler deflectors, heads, or devices. However, clearance of 24 to 36 inches is recommended.

2.2.10 Fire Prevention Inspections

Fire prevention inspections have four basic goals:

1. Minimize the size of fires by ensuring that combustible and flammable material storage is controlled.
2. Control ignition sources to reduce the possibility of fire.
3. Make sure that fire protection equipment is operational.
4. Make sure that personnel exit facilities are maintained.

The following will further explain what items which need to be inspected to ensure proper fire prevention at the site. Refer to the following fire prevention checklist.

2.2.11 Fire Protection Equipment

Fire extinguishers should be tagged and marked with the date of the last inspection. Gauges should show charge, and seals should be in place. The inspection should ensure that the extinguishers are hung in designated locations and that access is not blocked. The nozzle should be free and clear.

2.1 Fire Prevention and Protection

2.2.12 Fire Protection Systems

All systems and system components should be listed by recognized testing agencies according to their fire-fighting purposes. All systems should be inspected and or tested annually or as required by manufacturers' instructions. This is also required by NFPA 24 and local jurisdiction. The systems included are sprinklers, detection systems, and alarms. Detection systems are used often to reduce the threat to life and property by providing early warning to initiate manual fire fighting or evacuation of the workplace. The best way to ensure that the proper items are inspected is to conduct a monthly inspection following a standardized checklist of procedures. Refer to the checklist which is attached for procedures to be followed.

2.2.13 Alarms and Equipment

Whenever a fire breaks out, take immediate action:

1. Sound the alarm right away regardless of the size of the fire.
2. Attempt to extinguish or control the fire with appropriate fire-extinguishing equipment, as long as a life-threatening situation does not exist.

Fire Alarms

All employees should be carefully instructed in how, when, and where to report a fire. Many fires get out of control simply because someone did not know how, when, or where to give the alarm.

Extinguishers

Before employees can combat beginning fires effectively, they must be familiar with and understand the four classes of fires that might break out in their area.

Class A

Fires in ordinary combustible materials such as wood, paper, cloth, rubber, and many plastics, where the quenching and cooling effects of water or of the solutions containing large percentages of water are of prime importance.

Class B

Fires in flammable liquids, greases, oils, tars, oil-based paints, lacquers, and similar materials, where smothering or exclusion of air and interrupting the chain reaction are most effective. This class also includes flammable gases.

Class C

Fires in or near live electrical equipment, where the use of non-conductive extinguishing agent is of first importance. The material that is burning is, however, either Class A or Class B in nature.

Class D

Fires that occur in combustible metals such as magnesium, lithium, and sodium. Special extinguishing agents and techniques are needed for fires of this type.

Workers should practice the use of portable fire extinguishers and hoses at least yearly if they will be expected to use the equipment in the event of a fire at the facility. All fire extinguishers

2.1 Fire Prevention and Protection

must bear an approved label detailing the class of fire it is intended to combat. Check to see that extinguishers are not blocked by material or equipment and that signs indicating their location are clear and conspicuous. Periodic inspection and servicing of portable fire-extinguishing equipment should be performed and deficiencies relayed to those who will make corrective actions.

When inspecting fire extinguishers, they must meet the following requirements:

- Be kept fully charged and in their designated places.
- Be located along normal paths of travel where practical.
- Not be obstructed or obscured from view.
- Not be mounted higher than 5 feet (to the top of the extinguisher) if they weigh 40 pounds or less.
- Be inspected at least monthly, to make sure that they are in their designated places, have not been tampered with or actuated, and do not have corrosion or other impairment.
- Be examined at least yearly and/or recharged or repaired to ensure operability and safety. A tag must be attached to show the maintenance or recharge date and the signature or initials of the person performing the service.
- Be selected on the basis of type of hazard, degree of hazard, and area to be protected.

2.2.14 Evacuation

Prevention is the primary objective of any fire protection program. Nevertheless, this program must include provisions to ensure the safety of employees in the event of a fire.

We can do much to prepare for the safety of employees in the event of a serious fire. We should make sure that each employee knows the evacuation alarms, both primary and alternate exit and escape routes, what to do, and where to be during and after an evacuation. We should make sure that each person knows that he or she, upon being alerted, must proceed at a fast walking pace—not a run—to an assigned exit or, if it is blocked, to the nearest clear one. Oral instructions regarding evacuation procedures shall be given, and printed information describing these policies to all affected employees or occupants shall be distributed.

2.2.15 Program Audit

The requirements of this section shall be reviewed annually to ensure the workplace has not changed and all employees understand the procedures discussed herein.

DATE OF INSPECTION _____

PERFORMED BY _____

FIRE PREVENTION CHECKLIST DMG

ELECTRICAL EQUIPMENT

- ☐ No makeshift wiring
- ☐ Extension cords serviceable
- ☐ Motor and tools free of dirt and grease
- ☐ Lights clear of combustible
- ☐ Safest cleaning solvents used

- ☐ Fuse and control boxes clean and closed
- ☐ Circuits properly fused or otherwise protected
- ☐ Equipment approved for use in hazardous areas (if required)
- ☐ Ground connections clean and tight and have electrical continuity

FRICTION

- ☐ Machinery properly lubricated

- ☐ Machinery properly adjusted and/or aligned

SPECIAL FIRE-HAZARD MATERIALS

- ☐ Storage of special flammables isolated

- ☐ Nonmetal stock free of tramp metal

WELDING AND CUTTING

- ☐ Area surveyed for fire safety

- ☐ Combustibles removed or covered
- ☐ Permit issued

OPEN FLAMES

- ☐ Kept away from spray rooms and booths

- ☐ Portable torches clear of flammable surfaces
- ☐ No gas leaks

PORTABLE HEATERS

- ☐ Set up with ample horizontal and overhead clearances
- ☐ Secured against tipping or upset
- ☐ Combustibles removed or covered

- ☐ Safely mounted on non-combustible surface
- ☐ Not used as rubbish burners
- ☐ Use of steel drums prohibited

HOT SURFACES

- ☐ Hot pipes clear of combustible materials
- ☐ Ample clearance around boilers and furnaces

- ☐ Soldering irons kept off combustible surfaces
- ☐ Ashes in metal containers

SMOKING AND MATCHES

- ☐ "No smoking" and "smoking" areas clearly marked
- ☐ Butt containers available and serviceable

- ☐ No discarded smoking materials in prohibited areas

SPONTANEOUS IGNITION

- ☐ Flammable waste material in closed, metal containers
- ☐ Flammable waste material containers emptied frequently

- ☐ Piled material, cool, dry and well ventilated
- ☐ Trash receptacles emptied daily

STATIC ELECTRICITY

- ☐ Flammable liquid dispensing vessels grounded or bonded
- ☐ Moving machinery grounded

- ☐ Proper humidity maintained

HOUSKEEPING

- ☐ No accumulations of rubbish
- ☐ Safe storage of flammables
- ☐ Passageways clear of obstacles
- ☐ Automatic sprinklers unobstructed

- ☐ Premises free of unnecessary combustible materials
- ☐ No leaks or dripping of flammables and floor free of spills
- ☐ Fire doors unblocked and operating freely with fusible links intact

EXTINGUISHING EQUIPMENT

- ☐ Proper type
- ☐ In proper location
- ☐ Access unobstructed
- ☐ Clearly marked

- ☐ In working order
- ☐ Service date current
- ☐ Personnel trained in use of equipment

*Attach a list of all corrective actions and who will perform them.

2.2 Fall Protection

Employees

- Know when to use fall protection.
- Inspect all PFAS before each use.
- Do not use any fall protection equipment that is damaged in any way.
- Any damaged equipment shall be turned over to your supervisor as soon as damage is discovered.
- Ensure that fall protection equipment is properly used, cared for, and stored.
- Do not work on an elevated surface that is not properly guarded.
- If a backrail is not provided on a working surface that is elevated 5 feet or more, safety belts and lifelines must be worn.
- Report any situations that appear potentially hazardous to your supervisor immediately.

Employer

- Train all employees on the proper use and inspection of fall protection devices.
- Train all employees in the proper care and storage of fall protection devices.
- Ensure that any damaged equipment is removed from service upon discovery of damage. Damage equipment shall not be repaired, but destroyed and thrown away
- Ensure that all working surfaces are kept properly cleared and that employees take the proper precautions to protect their safety.

The criteria of this section apply to fall protection, PFAS and their use. Effective January 1, 1998, body belts and non-locking snap hooks are not acceptable as part of a personal fall arrest system.

2.2.1 Scaffolds or Staging

General requirements

All scaffolds and their supports whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4). All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine, or short fiber lumber is prohibited. Lumber dimensions as given in this subpart are nominal except where given in fractions of an inch. All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, wormholes or other defects that impair its strength or durability. Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold that is broken, burned or otherwise defective shall be replaced. Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms. No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

2.2 Fall Protection

Horse scaffolds

The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E-3 (also in 29 CFR 1915.118). Horses constructed of materials other than lumber shall provide the strength, rigidity and security required of horses constructed of lumber. The lateral spread of the legs shall be equal to not less than one-third of the height of the horse. All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure. Platform planking shall be in accordance with the requirements of this section. Backrails and toeboards shall be in accordance with this section.

Table 2-1. Specifications for the Construction of Horses

Structural members	Height in feet		
	Up to 10	10 to 16	16 to 20
	(inches)		
Legs	2 x 4	3 x 4	4 x 6
Bearers or headers	2 x 6	2 x 8	4 x 6
Crossbraces	2 x 4 or 1 x 8	2 x 4	2 x 6
Longitudinal braces	2 x 4	2 x 6	2 x 6

Other types of scaffolds

Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of this section shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

Scaffold or platform planking

Except as otherwise provided in this section, platform planking shall be of not less than 2 x 10-inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed. Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width. Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members. Table E-4 below (and in 1915.118) shall be used as a guide in determining safe loads for scaffold planks.

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Table 2-2. Safe Center Loads for Scaffold Plank of 1,100 Pounds Fiber Stress

Span in feet	Lumber dimensions in inches									
	A	B	A	B	A	B	A	B	A	B
	2x10	1 5/8 x 9 1/2	2x12	1 5/8 x 11 1/2	3 x 8	2 5/8 x 7 1/2	3x10	2 5/8 x 9 1/2	3x12	2 5/8 x 11 1/2
6	256		309		526		667		807	
8	192		232		395		500		605	
10	153		186		316		400		484	
12	128		155		263		333		404	
14	110		133		225		286		346	
16			116		197		250		303	

(A): Rough lumber.

(B): Dressed lumber.

Backrails and Toeboards

Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway. Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fiber rope rails shall not be used. Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted, employees working more than 5 feet above solid surfaces shall be protected by safety belts and life lines meeting the requirements of 29 CFR 1915.154(b), and employees working over water shall be protected by buoyant work vests meeting the requirements of 29 CFR 1915.154(a). Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail. When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 x 4 inch lumber shall be provided.

Access to staging

Access from below to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements of section 14.2 or rigid type non-collapsible trestles with parallel and level rungs. Ramps and stairways shall be provided with 36-inch handrails with midrails. Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than

2.2 Fall Protection

one foot from the ladder to any intermediate landing or platform. Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations. Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements of section 14.2 or a Jacob's ladder properly secured, meeting the requirements of section 14.4.

2.2.2 Ladders

General requirements

The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs. When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of side rails for their total length shall be those specified in this section. Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed. Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the American National Standards Institute Safety Code for Portable Metal Ladders, A14.2-1972. Portable metal ladders shall not be used near electrical conductors or for electric arc welding operations.

Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the American National Standards Institute Safety Code for Portable Wood Ladders, A14-1975. Construction of portable wood cleated ladders up to 30 feet in length. Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low-density woods is prohibited. Side rails shall be dressed on all sides and kept free of splinters. All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than 1/2 inch in diameter or within 1/2 inch of the edge of the rail or nearer than 3 inches to a tread or rung. Pitch pockets not exceeding 1/8 inch in width, 2 inches in length and 1/2 inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length. The width between side rails at the base shall be not less than 11 1/2 inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least 1/4 inch for each additional 2 feet in length. Side rails shall be at least 1 5/8 x 3 5/8 inches in cross section. Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails 1/2 inch, or filler blocks shall be used on the

2.2 Fall Protection

rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart. Cleats 20 inches or less in length shall be at least 25/32 x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least 25/32 x 3 3/4 inches in cross section. Construction of portable wood cleated ladders from 30 to 60 feet in length. Ladders from 30 to 60 feet in length shall be in accordance with the specifications of this section with the following exceptions:

- Rails shall be of not less than 2 x 6 inch lumber.
- Cleats shall be of not less than 1 x 4 inch lumber.
- Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fastenings of equivalent strength.

2.2.3 Access to vessels.

Access to vessels afloat

The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

- Whenever practicable, a gangway of not less than 20 inches walking surface of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of paragraphs (d)(1) and (2) of this section may be used.
- Each side of such gangway, and the turn table if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with a mid rail. Rails shall be of wood, pipe, chain, wire or rope and shall be kept taut at all times.
- Gangways on vessels inspected and certificated by the U.S. Coast Guard are deemed to meet the foregoing requirements, except in cases where the vessel's regular gangway is not being used.
- The gangway shall be kept properly trimmed at all times.
- When a fixed tread accommodations ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.
- When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.
- If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with midrails on both sides.

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- Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.
- When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.
- Obstructions shall not be laid on or across the gangway.
- The means of access shall be adequately illuminated for its full length.
- Unless the construction of the vessel makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event, loads shall not be passed over the means of access while employees are on it.

Access to vessels in dry-dock or between vessels

Gangways meeting the requirements of this section shall be provided for access from wingwall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, from one vessel to another.

Access to barges and river towboats

Ramps for access of vehicles to or between barges shall be of adequate strength, provided with sideboards, well maintained and properly secured. Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of this section shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping, shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder in accordance with the requirements of this section may be used. The means of access shall be in accordance with the requirements of this section.

Jacob's ladders

Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured. A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

2.2.3 Access to and Guarding of Dry Docks and Marine Railways.

A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead. Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a mid rail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope, and shall be kept taut at all times. Railings meeting the requirements of this section shall be provided on the means of access to and from the floors of graving docks. Railings approximately 42 inches in height, with a mid rail, shall be provided on the edges of wing walls of floating dry docks and on

2.2 Fall Protection

edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering or leaving the dock. When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42 inch railings with a mid rail. When such a railing would be impracticable or ineffective, other effective means shall be provided to prevent men from falling into the water. Access to wing walls from floors of dry docks shall be by ramps, permanent stairways or ladders meeting the applicable requirements of 29 CFR 1915.72. Catwalks on stiles of marine railways shall be no less than 20 inches wide and shall have on at least one side a guardrail and midrail meeting the requirements of 1915.71(j)(1) and (2).

2.2.4 Access to cargo spaces and confined spaces

Cargo spaces

There shall be at least one safe and accessible ladder in any cargo space which employees must enter. When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees. Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of this section. When conditions are such that a straight ladder cannot be used, a Jacob's ladder meeting the requirements of 29 CFR 1915.74(d) may be used. Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that cargo drafts, equipment, materials, scrap or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or crane signalman of his intention.

Confined spaces

More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere in the space except where the structure or arrangement of the vessel makes this provision impractical. When the ventilation ducts required by these regulations must pass through these means of access, the ducts shall be of such a type and so arranged as to permit free passage of an employee through at least two of these means of access.

2.2.5 Working surfaces

When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting the requirements of 29 CFR 1915.154.

2.2.6 Criteria for Connectors and Anchorages

Connectors shall be made of drop forged, pressed, or formed steel or shall be made of materials with equivalent strength. Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to the interfacing parts of the system.

2.2 Fall Protection

D-rings and snaphooks shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 KN), and shall be proof-tested to a minimum tensile load of 3,600 pounds (16 KN) without cracking, breaking, or being permanently deformed. Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook caused by depression of the snaphook keeper by the connected member, or shall be of a locking type that is designed and used to prevent disengagement of the snap-hook by contact of the snaphook keeper by the connected member. Unless of a locking type which is designed and used to prevent disengagement from the following connections, snaphooks shall not be engaged:

- directly to webbing, rope or wire rope;
- to each other;
- to a D-ring to which another snaphook or other connector is attached;
- to a horizontal lifeline; or
- to any object that is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used for connection to the horizontal lifeline shall be capable of locking in any direction on the lifeline.

Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms. Anchorages shall be capable of supporting at least 5,000 pounds (22.2 KN) per employee attached, or shall be designed, installed, and used as follows:

- as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- under the direction and supervision of a qualified person.

2.2.7 Criteria for Lifelines, Lanyards, and Personal Fall Arrest Systems

When vertical lifelines are used, each employee shall be provided with a separate lifeline. Vertical lifelines and lanyards shall have a minimum tensile strength of 5,000 pounds (22.2 KN).

Self-retracting lifelines and lanyards that automatically limit free fall distances to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3000 pounds (13.3 KN) applied to a self-retracting lifeline or lanyard with the lifeline or lanyard in the fully extended position. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards and tearing and deforming lanyards shall be capable of sustaining a minimum static tensile load of 5,000 pounds (22.2 KN) applied to the device when they are in the fully extended position.

2.2 Fall Protection

Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person, and shall only be used as part of a complete personal fall arrest system that maintains a safety factor of at least two.

Personal fall arrest systems shall:

- limit the maximum arresting force on a falling employee to 900 pounds (4 KN) when used with a body belt;
- limit the maximum arresting force on a falling employee to 1,800 pounds (8 KN) when used with a body harness;
- bring a falling employee to a complete stop and limit the maximum deceleration distance an employee travels to 3.5 feet (1.07 m), and
- have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less;

Personal fall arrest systems shall be rigged such that an employee can neither free fall more than 6 feet (1.8 m) nor contact any lower level.

2.2.8 Criteria for Selection, Use and Care of Systems and System Components

Lanyards shall be attached to employees using personal fall arrest systems, as follows:

- The attachment point of a body harness shall be located in the center of the wearer's back near the shoulder level, or above the wearer's head. If the free fall distance is limited to less than 20 inches, the attachment point may be located in the chest position; and
- The attachment point of a body belt shall be located in the center of the wearer's back.

Ropes and straps (webbing) used in lanyards, lifelines and strength components of body belts and body harnesses shall be made from synthetic fibers or wire rope. Ropes, belts, harnesses, and lanyards shall be compatible with their hardware. Lifelines and lanyards shall be protected against cuts, abrasions, burns from hot work operations and deterioration by acids, solvents, and other chemicals.

Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration. Defective components shall be removed from service. Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a qualified person to be undamaged and suitable for reuse.

DMG shall provide for prompt rescue of employees in the event of a fall or shall ensure that employees are able to rescue themselves.

2.2 Fall Protection

Body belts shall be at least one and five eighths inches (4.1 cm) wide. Personal fall arrest systems and components shall be used only for employee fall protection and not to hoist materials.

2.2.9 Training

Before using personal fall arrest equipment, each affected employee shall be trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Affected employees shall also be trained so that they can demonstrate the proper use, inspection, and storage of their equipment.

2.3 Crane and Rigging Safety

Employees

- Inspect cranes and rigging daily before beginning work.
- Do not perform work with defective gear; make all repairs immediately.
- If the crane operator you are unable to see the load being handled, have a signalman to assist you while performing work.
- Ensure that other employees are notified before loads are lifted and moved.

Employer

- Inspect cranes and rigging daily before beginning work.
- Ensure that employees do not perform work with defective gear; ensure that all repairs are made immediately.
- If the crane operator is unable to see the load being handled, provide a signalman.
- Ensure that other employees are notified before loads are lifted and moved.
- Document all employee training in crane operation and all repairs performed on cranes.

2.3.1 Inspection

All gear and equipment provided by the employer for rigging and materials handling will be inspected before each shift and when necessary, at intervals during its use to ensure that it is safe. Defective gear will be removed and repaired or replaced before further use. The safe working load of gear as specified below will not be exceeded.

2.3.2 Ropes, chains and slings

Manila rope and manila rope slings

Table G-1 at the end of this section (also found in 1915.118) will be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

Wire rope and wire rope slings

Tables G-2 through G-5 at the end of this section (also found in 1915.118) will be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products will be followed, provided that a safety factor of not less than five (5) is maintained. Protruding ends of strands in splices on slings and bridles will be covered or blunted. Where U-bolt wire rope clips are used to form eyes, Table G-6 at the end of this section (also in 1915.118) will be used to determine the number and spacing of clips. The U-bolt will be

2.3 Crane and Rigging Safety

applied so that the "U" section is in contact with the dead end of the rope. Wire rope will not be secured by knots.

Chains and chain slings

(1) Tables G-7 and G-8 at the end of this section (also in 1915.118) will be used to determine the working load limit of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products. All sling chains, including end fastenings, will be given a visual inspection before being used on the job. A thorough inspection of all chains in use will be made every 3 months. Each chain will bear an indication of the month in which it was thoroughly inspected. The thorough inspection will include inspection for wear, defective welds, deformation and increase in length or stretch. Interlink wear, not accompanied by stretch in excess of 5 percent, will be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G-9 at the back of this section (also in 1915.118) has been reached. Chain slings will be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear. All repairs to chains will be made under qualified supervision. Links or portions of the chain found to be defective as described in this section will be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they will be proof tested to the proof test load recommended by the manufacturer. Wrought iron chains in constant use will be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer will be consulted for recommended procedures for annealing or normalizing. Alloy chains will never be annealed. A load will not be lifted with a chain having a kink or knot in it. A chain will not be shortened by bolting, wiring or knotting.

2.3.3 Shackles and hooks

Shackles

Table G-10 at the end of this section (also in 1915.118) will be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than (5) is maintained.

Hooks

The manufacturer's recommendations will be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available will be tested to twice the intended safe working load before they are initially put into use. The employer will maintain and keep readily available a certification record that includes the date of such tests, the signature of the person who

2.3 Crane and Rigging Safety

performed the test and an identifier for the hook that was tested. Loads will be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

Hooks will be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks will not be used.

2.3.4 Chain falls and pull-lifts

Chain falls and pull-lifts will be clearly marked to show the capacity and the capacity will not be exceeded. Chain falls will be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts will be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear. Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured will be of adequate strength to support the weight of load plus gear. The upper hook will be moused or otherwise secured against coming free of its support. Scaffolding will not be used as a point of attachment for lifting devices such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

2.3.5 Hoisting and hauling equipment

Derrick and crane certification

Derricks and cranes which are part of, or regularly placed aboard barges, other vessels, or on wingwalls of floating drydocks, and are used to transfer materials or equipment from or to a vessel or drydock, will be tested and certificated in accordance with the standards provided in 29 CFR 1919 by persons accredited for the purpose. The moving parts of hoisting and hauling equipment will be guarded.

Mobile crawler or truck cranes used on a vessel

The maximum manufacturer's rated safe working loads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers will be conspicuously posted near the controls and will be visible to the operator. A radius indicator will be provided. The posted safe working loads of mobile crawler or truck cranes under the conditions of use will not be exceeded.

Accessible Areas

Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane wither permanently or temporarily mounted, will be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

2.3 Crane and Rigging Safety

Marine railways

The cradle or carriage on the marine railway will be positively blocked or secured when in the hauled position to prevent it from being accidentally released.

2.3.6 Use of gear

Loads will be safely rigged before being hoisted. When slings are secured to eye-bolts, the slings will be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt. Slings will be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking. Skips will be rigged to be handled by not less than 3-legged bridles, and all legs will always be used. When open-end skips are used, means will be taken to prevent the contents from falling. Loose ends of idle legs of slings in use will be hung on the hook.

Employees will not be permitted to ride the hook or the load. Loads (tools, equipment or other materials) will not be swung or suspended over the heads of employees. Pieces of equipment or structure susceptible to falling or dislodgement will be secured or removed as early as possible.

An individual who is familiar with the signal code in use will be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications will be made by means of clear and distinct visual or auditory signals except that verbal signals will not be permitted. Pallets, when used, will be of such material and construction and so maintained as to safely support and carry the loads being handled on them.

A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, will be completely opened. The beam or pontoon left in place adjacent to an opening will be sufficiently lashed, locked or otherwise secured to prevent it from being unshipped so that it cannot be displaced by accident. Hatches will not be open or closed while employees are in the square of the hatch below. Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning will be given to employees in the vicinity of such operations. At no time will an employee be permitted to place himself in a hazardous position between a swinging load and a fixed object.

2.3.7 Qualifications of Operators

Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, will be permitted to operate a crane, winch, or other power operated hoisting apparatus. No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, will be permitted to operate a crane, winch or other power operated hoisting apparatus.

2.4 Machine Guarding

Employee

- DO NOT remove machine guards at any time without approval of shipyard supervisor.
- NEVER remove machine guards while a machine is in operation.
- Do not operate a machine where the machine guard has been removed.
- Notify your supervisor of a missing or broken machine guard or guards.

Employer

- Ensure that machine guards have been installed as required.
- Ensure that all machine guards are working properly.
- Fix any broken machine guard or replace a broken machine guard as soon as possible.
- Establish and maintain a program of regular and periodic inspections.

2.4.1 Types of guarding

One or more methods of machine guarding will be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods include barrier guards, two-hand tripping devices, electronic safety devices, etc.

2.4.2 General requirements for machine guards

Guards will be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard will be such that it does not offer an accident hazard in itself.

2.4.3 Point of operation guarding

Point of operation is the area on a machine where work is actually performed upon the material being processed.

The point of operation of machines, whose operation exposes an employee to injury, will be guarded. The guarding device will be in conformity with any appropriate standards therefor, or, in the absence of applicable specific standards, will be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

Special hand tools for placing and removing material will be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools will not be in lieu of other guarding required by this section, but can only be used to supplement protection provided.

The following are some of the machines that usually require point of operation guarding:

- Guillotine cutters;
- Shears;

2.4 Machine Guarding

- Alligator shears;
- Power presses;
- Milling machines;
- Power saws;
- Jointers;
- Portable power tools; and
- Forming rolls and calenders.

2.4.4 Barrels, containers, and drums

Revolving drums, barrels, and containers will be guarded by an enclosure that is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

2.4.5 Exposure of blades

When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades will be guarded. The guard will have openings no larger than one-half (1/2) inch.

2.4.6 Anchoring fixed machinery

Machines designed for a fixed location will be securely anchored to prevent walking or moving.

2.5 Hot Work Procedures

Employees

- Do not enter spaces to perform hot work that have not been gas freed.
- Properly use all personal protective equipment (respirators, eye protection, and gloves) that has been provided to you.
- Do not use torches or welding tools if you have not been trained in their use.

Employer

- Ensure that all voids (spaces) have been gas freed before initiating hot work.
- Provide all workers the necessary ventilation and/or personal protective equipment (respirators, eye protection, and gloves).
- Ensure that all workers have been properly trained in the use of torches, welding tools, and the hazards associated with such use.

2.5.1 Welding Procedures

Ventilation and protection in welding, cutting and heating

Mechanical ventilation requirements

Mechanical ventilation shall meet the following requirements:

- Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.
- General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.
- Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.
- Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.
- All air replacing that withdrawn shall be clean and respirable.
- Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

Welding, cutting and heating in confined spaces

Except as provided in this section either general ventilation meeting the requirements of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

The means of access shall be provided to a confined space and ventilation ducts to this space

2.5 Hot Work Procedures

shall be arranged in accordance with confined space procedures described in the section addressing confined spaces.

When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of this section, and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

Welding, cutting or heating of metals of toxic significance

Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified below shall be performed with either general mechanical or local exhaust ventilation meeting the requirements described above:

- Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.
- Lead base metals.
- Cadmium-bearing filler materials.
- Chromium bearing metals or metals coated with chromium-bearing materials.

Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified below shall be performed with local exhaust ventilation in accordance with the requirements of this section or employees shall be protected by air line respirators in accordance with the requirements of this section:

- Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.
- Cadmium-bearing or cadmium coated base metals.
- Metals coated with mercury-bearing metals.
- Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

Employees performing such operations in the open air shall be protected by filter type respirators in accordance with the requirements of this section, except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of this section.

Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

General welding, cutting, and heating

Welding, cutting and heating not involving conditions or materials described below may normally be done without mechanical ventilation or respiratory protective equipment, but where,

2.5 Hot Work Procedures

because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements above. Residues and cargoes of metallic ores of toxic significance shall be removed from the area or protected from the heat before ship repair work that involves welding, cutting or heating is begun.

Fire prevention

When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards including residues of combustible bulk cargoes in the vicinity shall be taken to a safe place. If the object to be welded, cut or heated cannot be moved and if all the fire hazards including combustible cargoes cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch hour. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from confined spaces when they are disconnected from the torch or other gas-consuming device.

Welding, cutting and heating in way of preservative coatings

Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable they shall be stripped from the area to be heated to prevent ignition, or, where shipbreaking is involved, the coatings may be burned away under controlled conditions. A 1 1/2 inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.

Protection against toxic preservative coatings

2.5 Hot Work Procedures

In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application or the employees shall be protected by air line respirators meeting the requirements above.

In the open air, employees shall be protected by a filter type respirator in accordance with the requirements in this section.

Welding, cutting and heating of hollow metal containers and structures

Drums, containers, or hollow structures that have contained flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

Objects such as those listed above shall also be inspected to determine whether water or other non-flammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure that may build up during the application of heat.

2.5.2 Gas Welding and Cutting

Transporting, moving and storing compressed gas cylinders

Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps. When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings. Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently. When cylinders are transported by vehicle, they shall be secured in position. Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved. A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use. When work is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valves shall be closed. Acetylene cylinders shall be secured

2.5 Hot Work Procedures

in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

Placing cylinders

Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided. Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc. Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat. Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

Treatment of cylinders

Cylinders, whether full or empty, shall not be used as rollers or supports. No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used. No damaged or defective cylinder shall be used.

Use of fuel gas

The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

- Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.
- The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1 1/2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.
- Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.
- Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

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- If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.
- If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

Fuel gas and oxygen manifolds

Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it. Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces. Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil. When not in use, manifold and header hose connections shall be capped. Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

Hoses

Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used. When parallel sections of oxygen and fuel gas hose are taped together not more than 4 inches out of 8 inches shall be covered by tape. All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service. Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used. Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion. Boxes used for the stowage of gas hose shall be ventilated.

Torches

Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose. Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used. Torches

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shall be lighted by friction lighters or other approved devices, and not by matches or from hot work. Pressure regulators. Oxygen and fuel gas pressure regulators including their related gauges shall be in proper working order while in use.

2.5.3 Arc Welding and Cutting

Manual electrode holders

Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used. Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

Welding cables and connectors

All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working. Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted. When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated. Cables in poor repair shall not be used. When a cable other than the cable lead referred to above becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

Ground returns and machine grounding

A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services. Structures or pipe lines, except pipe lines containing gases of flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required above. When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit. When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use. The frames of all arc welding and cutting machines shall be grounded either through a third wire

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in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

Operating instructions

Employers shall instruct employees in the safe means of arc welding and cutting as follows:

- When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.
- Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.
- When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.
- Any faulty or defective equipment shall be reported to the supervisor.

Shielding

Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

2.5.4 Procedures for Hot Work

Initial Operations

After the initial mooring of a vessel, no personnel shall enter the vessel prior to the inspection of the vessel by a marine chemist unless specifically authorized by the competent person. No smoking or open flames shall be permitted on board during tie up operations, until cutting procedures have been authorized. A competent person shall make a preliminary inspection to authorize personnel to board and begin hatch opening operations. During the hatch opening operations, personnel shall work in-groups of two or more to test previously closed spaces for oxygen concentration. No personnel shall be permitted to enter these spaces unless the test shows oxygen content to be at least 19.5%.

Torch cutting of windows for the purpose of installing gangways prior to the marine chemist's inspection shall be performed with the specific authorization of the marine chemist. At the

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completion of the marine chemist's inspection, he/she shall issue a certificate demonstrating the completion of the inspection.

General Operations

Cutting operations shall proceed according to the marine chemist's instructions at the authorization of the competent person as issued to the foreman and/or lead men. A minimum of two water line hoses, not less than 1/2" in diameter with fog nozzles, shall be fully charged and on board before the commencement of cutting.

A fire watch shall be kept during cutting operations and for a minimum period of one hour after all cutting operations cease. A fire permit from the Chesapeake Fire Department shall be obtained before any hot work is started. A visual inspection of the torches and torch hoses shall be made at the beginning of every shift and after every lunch break, with necessary repairs being made. Fire lines shall be visually inspected and tested at the beginning of each shift. All damage to the fire lines shall be repaired or the hose shall be replaced as soon as damage is noted. All hoses shall be pressure-tested and dated. Fire fighting training shall be held monthly and documented by the Environmental Supervisor.

End of Day Operations

Aboard ship, all gas hoses shall be moved to the existing deck and neatly coiled, with the gas turned off at the manifold. In the yard, all gas hoses shall be neatly coiled at the manifold and the supply valves closed.

2.6 Marine Safety

Employees

- If you are unable to swim, you **MUST** wear an approved life vest at all times.
- Know where the life rings and ladder(s) are located in the event of an emergency.

Employer

- Provide approved personal flotation devices (PFDs) for all workers. Ensure that these devices are in good working order.
- Ensure that PFDs are worn by all workers who are unable to swim.
- At a minimum, provide three life rings aboard the vessel. One life ring must be forward, one aft, and one must be located at the gangway.
- Provide a permanent or portable ladder in the vicinity of the ship that is long enough to help an employee out of the water in the event that they should fall into the water.

In order to protect workers from any water hazards that may be incurred, the following procedures will be followed.

2.6.1 Personal flotation devices

There are five types of Personal Flotation Device (PFD):

1. Type I is an offshore lifejacket. Type I PFD will right an unconscious wearer and will usually keep the wearer's face out of the water. Type I PFD's are bulky and uncomfortable to wear for long periods of time.
2. Type II is a near shore buoyancy vest. Type II PFD will right an unconscious wearer and will usually keep the wearer's face out of the water. Type II PFD's are bulky and uncomfortable to wear for long periods of time.
3. Type III is a floatation aid. Generally the most comfortable PFD is the Type III which has at least 15.5 pounds of buoyancy in the adult size. The Type III PFD provides adequate buoyancy, but will not turn the wearer face-up in the water. The Type III device is more comfortable to wear, and is designed to be worn as work attire. Common Type III devices are work vests and harnesses with built in pneumatic floatation.
4. Type IV is a throwable device. Type IV PFDs include the horseshoe collar, ring buoy, and seat cushion. They have at least 16.5 pounds of buoyancy and must offer immediate access.
5. Type V is a hybrid inflatable or special use device. A Type V PFD is special purpose floatation. The full body insulating floatation suits that are suitable for work in cold weather are Type V devices. PFDs designed to survive high-speed impacts (like water skiing vests and jet-ski vests) are Type V devices. Some Type V PFDs are CO2 activated, and are very low profile until inflated.

2.6 Marine Safety

PFDs (life preservers, life jackets and work vests) worn by each affected employee shall be any United States Coast Guard (USCG) approved and marked Type I PFD, Type II PFD, or Type III PFD; or PFDs shall be a USCG approved Type V PFD which is marked for use as a work vest, for commercial use, or for use on vessels. USCG approval is pursuant to 46 CFR part 160, subpart Q, Coast Guard Lifesaving Equipment Specifications.

Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects that may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

2.6.2 Ring life buoys and ladders

When work is being performed on a floating vessel 200 feet (61 m) or more in length, at least three 30-inch (0.76 m) U.S. Coast Guard approved ring life buoys with lines attached shall be located in readily visible and accessible places. Ring life buoys shall be located one forward, one aft, and one at the access to the gangway. On floating vessels under 200 feet (61 m) in length, at least one 30-inch (0.76 m) U.S. Coast Guard approved ring life buoy with line attached shall be located at the gangway. At least one 30-inch (0.76 m) U. S. Coast Guard approved ring life buoy with a line attached shall be located on each staging alongside of a floating vessel on which work is being performed. At least 90 feet (27 m) of line shall be attached to each ring life buoy. There shall be at least one portable or permanent ladder in the vicinity of each floating vessel on which work is being performed. The ladder shall be of sufficient length to assist employees to reach safety in the event that they fall into the water.

2.7 Confined Spaces

Employees

- Do not enter spaces that have not been cleared for entry.
- Do not enter confined spaces unless you have received proper training.
- Do not enter confined spaces without another worker present immediately outside of the space.

Employer

- Define the confined spaces present or possibly presented.
- Do not enter spaces that have not been cleared for entry.
- Allow only workers who have been trained in confined space entry to enter confined spaces.
- Do not allow workers to enter confined spaces without another worker present immediately outside of the space.
- A rescue team must be provided which has been trained in confined space rescue procedures. This team may be composed of either DMG employees or it may be an outside rescue team that can respond promptly in the event of an emergency.
- Records must be kept to document employee training and the training of a competent person who is responsible for clearing spaces for entry.

2.7.1 Purpose

DMG has developed this confined space entry program to outline requirements, equipment needs, and procedures necessary to conduct safe operations in confined space situations.

2.7.2 Scope and Application

This Section applies to work in confined and enclosed spaces and other dangerous atmospheres in the DMG work place, including vessels, vessel sections, and on land-side operations regardless of geographic location.

2.7.3 Definitions

"Adjacent spaces" means those spaces bordering a subject space in all directions, including all points of contact, corners, diagonals, decks, tank tops, and bulkheads.

"Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

"Certified Industrial Hygienist (CIH)" means an industrial hygienist who is certified by the American Board of Industrial Hygiene.

2.7 Confined Spaces

"Coast Guard authorized person" means an individual who meets the requirement of Appendix B to subpart B of this part 1915 for tank vessels, for passenger vessels, and for cargo and miscellaneous vessels.

"Competent Person" means that DMG shall ensure that each designated competent person has the following skills and knowledge:

- (1) Ability to understand and carry out written or oral information or instructions left by Marine Chemist, Coast Guard authorized persons and Certified Industrial Hygienists;
- (2) Knowledge of 29 CFR 1915;
- (3) Knowledge of the structure, location, and designation of spaces where work is done;
- (4) Ability to calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;
- (5) Ability to perform all required tests and inspections which are or may be performed by a competent person as set forth in 29 CFR 1915;
- (6) Ability to inspect, test, and evaluate spaces to determine the need for further testing by a Marine Chemist or a Certified Industrial Hygienist; and
- (7) Ability to maintain records required by this section.

"Dangerous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a confined or enclosed space), injury, or acute illness.

"Director" means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

"Enter with Restrictions" denotes a space where entry for work is permitted only if engineering controls, personal protective equipment, clothing, and time limitations are as specified by the Marine Chemist, Certified Industrial Hygienist, or the shipyard competent person.

"Entry" means the action by which a person passes through an opening into a space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

"Hot" work means any activity involving riveting, welding, burning, the use of powder-actuated tools or similar fire-producing operations. Grinding, drilling, abrasive blasting, or similar spark-producing operations are also considered hot work except when such operations are isolated physically from any atmosphere containing more than 10 percent of the lower explosive limit of a flammable or combustible substance.

"Immediately" dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life or that is likely to result in acute or immediate severe health effects.

2.7 Confined Spaces

"Inert" or "inerted atmosphere" means an atmospheric condition where:

1. The oxygen content of the atmosphere in the space is maintained at a level equal to or less than 8 percent by volume or at a level at or below 50 percent of the amount required to support combustion, whichever is less; or
2. The space is flooded with water and the vapor concentration of flammable or combustible materials in the free space atmosphere above the water line is less than 10 percent of the lower explosive limit for the flammable or combustible material.

"Labeled" means identified with a sign, placard, or other form of written communication, including pictograms, that provides information on the status or condition of the work space to which it is attached.

"Lower explosive limit (LEL)" means the minimum concentration of vapor in air below which propagation of a flame does not occur in the presence of an ignition source.

"Marine Chemist" means an individual who possesses a current Marine Chemist Certificate issued by the National Fire Protection Association.

"Not Safe for Hot Work" denotes a space where hot work may not be performed because the conditions do not meet the criteria for Safe for Hot Work.

"Nationally Recognized Testing Laboratory (NRTL)" means an organization recognized by OSHA, in accordance with Appendix A of 29 CFR 1910.7, which tests for safety and lists or labels or accepts equipment and materials that meet all the criteria found in 1910.7(b)(1) through (b)(4)(ii).

"Not Safe for Workers" denotes a space where an employee may not enter because the conditions do not meet the criteria for Safe for Workers.

"Oxygen-deficient atmosphere" means an atmosphere having an oxygen concentration of less than 19.5 percent by volume.

"Oxygen-enriched atmosphere" means an atmosphere that contains 22 percent or more oxygen by volume.

"Safe for Hot Work" denotes a space that meets all of the following criteria:

1. The oxygen content of the atmosphere does not exceed 22 percent by volume;
2. The concentration of flammable vapors in the atmosphere is less than 10 percent of the lower explosive limit;
3. The residues or materials in the space are not capable of producing a higher concentration than permitted in paragraph (1) or (2) of the above, under existing atmospheric conditions

2.7 Confined Spaces

in the presence of hot work and while maintained as directed by the Marine Chemist or competent person, and

4. All adjacent spaces have been cleaned, or gas-freed, or treated sufficiently to prevent the spread of fire.

"Safe for Workers" denotes a space that meets the following criteria:

1. The oxygen content of the atmosphere is at least 19.5 percent and below 22 percent by volume;
2. The concentration of flammable vapors is below 10 percent of the lower explosive limit (LEL);
3. Any toxic materials in the atmosphere associated with cargo, fuel, tank coatings, or gas-freeing media are within permissible concentrations at the time of the inspection; and
4. Any residues or materials associated with the work authorized by the Marine Chemist, Certified Industrial Hygienist, or competent person will not produce uncontrolled release of toxic materials under existing atmospheric conditions while maintained as directed.

"Space" means an area on a vessel or vessel section or within a shipyard such as, but not limited to: cargo tanks or holds; pump or engine rooms; storage lockers; tanks containing flammable or combustible liquids, gases, or solids; rooms within buildings; crawl spaces; tunnels; or access ways. The atmosphere within a space is the entire area within its bounds.

"Upper explosive limit (UEL)" means the maximum concentration of flammable vapor in air above which propagation of flame does not occur on contact with a source of ignition.

"Vessel section" means a sub-assembly, module, or other component of a vessel being built, repaired, or broken.

"Visual inspection" means the physical survey of the space, its surroundings and contents to identify hazards such as, but not limited to, restricted accessibility, residues, unguarded machinery, and piping or electrical systems.

2.7.4 Record Keeping

When tests and inspections are performed by a competent person, Marine Chemist, or Certified Industrial Hygienist as required by any provisions of 29 CFR 1915 subparts B, C, D, or H, DMG shall ensure that the person performing the test and inspection records the location, time, date, location of inspected spaces, and the operations performed, as well as the test results and any instructions.

DMG shall maintain either a roster of designated competent persons or a statement that a Marine Chemist will perform the tests or inspections that require a competent person. DMG shall make the roster of designated persons or the statement available to employees, the employee's representative, or OSHA upon request.

2.7 Confined Spaces

The roster shall contain, as a minimum, the following:

- DMG employee name(s), and
- The date the employee was trained as a competent person.

DMG shall ensure that the records are posted in the immediate vicinity of the affected operations while work in the spaces is in progress. The records shall be kept on file for a period of at least three months from the completion date of the specific job for which they were generated. DMG shall ensure that the records are available for inspection by OSHA, and employees and their representatives. An example confined space permit, the typical record used in testing and clearing confined spaces, is provided at the end of this section.

2.7.5 Atmospheric Testing

DMG shall ensure that atmospheric testing is performed in the following sequence: oxygen content, flammability, and toxicity.

Oxygen content

DMG shall ensure that the following spaces are visually inspected and tested by a competent person to determine the atmosphere's oxygen content prior to initial entry into the space by an employee:

- Spaces that have been sealed, such as, but not limited to, spaces that have been coated and closed up, and non-ventilated spaces that have been freshly painted;
- Spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases;
- Spaces and adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive, or irritant;
- Spaces and adjacent spaces that have been fumigated; and
- Spaces containing materials or residues of materials that create an oxygen-deficient atmosphere.

If the space to be entered contains an oxygen deficient atmosphere, the space shall be labeled "Not Safe for Workers" or, if oxygen-enriched, "Not Safe for Workers - Not Safe for Hot Work." If an oxygen-deficient or oxygen-enriched atmosphere is found, ventilation shall be provided at volumes and flow rates sufficient to ensure that the oxygen content is maintained at or above 19.5 percent and below 22 percent by volume. The warning label may be removed when the oxygen content is equal to or greater than 19.5 and less than 22 percent by volume.

An employee may not enter a space where the oxygen content, by volume, is below 19.5 percent or above 22 percent.

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Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space provided:

- The atmosphere in the space is monitored for oxygen content, by volume, continuously; and
- Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with the conditions established by and as described in this program and other requirements of the Shipyard Health and Safety Plan.

Flammable Atmospheres

DMG shall ensure that spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases are:

- Inspected visually by the competent person to determine the presence of combustible or flammable liquids; and
- Tested by a competent person prior to entry by an employee to determine the concentration of flammable vapors and gases within the space.

If the concentration of flammable vapors or gases in the space to be entered is equal to or greater than 10 percent of the lower explosive limit, the space shall be labeled "Not Safe for Workers" and "Not Safe for Hot Work." Ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors is maintained below 10 percent of the lower explosive limit. The warning labels may be removed when the concentration of flammable vapors is below 10 percent of the lower explosive limit.

An employee may not enter a space where the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space, provided:

- No ignition sources are present;
- The atmosphere in the space is monitored continuously;
- Atmospheres at or above the upper explosive limit are maintained; and
- Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with Subpart I of 29 CFR 1915.

Toxic, corrosive, irritant or fumigated atmospheres and residues

DMG shall ensure that spaces or adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive or irritant are:

2.7 Confined Spaces

- Inspected visually by the competent person to determine the presence of toxic, corrosive, or irritant residue contaminants; and
- Tested by a competent person prior to initial entry by an employee to determine the air concentration of toxics, corrosives, or irritants within the space.

If a space contains an air concentration of a material which exceeds a 29 CFR 1915 Subpart Z permissible exposure limit (PEL) or is immediately dangerous to life or health (IDLH), the space shall be labeled "Not Safe for Workers." Ventilation shall be provided at volumes and flow rates which will ensure that air concentrations are maintained within the PEL or, in the case of contaminants for which there is no established PEL, below the IDLH. The warning label may be removed when the concentration of contaminants is maintained within the PEL or below IDLH level.

If a space cannot be ventilated to within the PELs or is IDLH, a Marine Chemist or CIH must re-test until the space can be certified "Enter with Restrictions" or "Safe for Workers."

An employee may not enter a space whose atmosphere exceeds a PEL or is IDLH.
Exception: An employee may enter for emergency rescue, or for a short duration for installation of ventilation equipment provided:

- The atmosphere in the space is monitored continuously; and
- Respiratory protection and other necessary and appropriate personal protective equipment and clothing are provided in accordance with and as described in this Health and Safety Plan.

2.7.6 Employee Training

DMG shall ensure that each employee that enters a confined or enclosed space and other areas with dangerous atmospheres is trained to perform all required duties safely. G shall ensure that each employee who enters a confined space, enclosed space, or other areas with dangerous atmospheres is trained to:

- Recognize the characteristics of the confined space;
- Anticipate and be aware of the hazards that may be faced during entry;
- Recognize the adverse health effects that may be caused by the exposure to a hazard;
- Understand the physical signs and reactions related to exposures to such hazards;
- Know what personal protective equipment is needed for safe entry into and exit from the space;
- Use personal protective equipment;
- Know when and how to complete and comply with the requirements of a confined space entry permit, and other permits which may be required (hot work permit); and,
- Where necessary, be aware of the presence and proper use of barriers that may be needed to protect an entrant from hazards.

2.7 Confined Spaces

DMG shall ensure that each entrant into confined or enclosed spaces or other dangerous atmospheres is trained to exit the space or dangerous atmosphere whenever:

- DMG or his or her representative orders evacuation;
- An evacuation signal such as an alarm is activated; or
- The entrant perceives that he or she is in danger.

DMG shall provide each employee with training:

- Before the entrant begins work addressed by this section; and
- Whenever there is a change in operations or in an employee's duties that presents a hazard about which the employee has not previously been trained.

DMG shall certify that the training required this section has been accomplished. The certification shall contain the employee's name, the name of the certifier, and the date(s) of the certification. The certification shall be available for inspection by OSHA, employees, and their representatives.

2.7.7 Rescue Teams

DMG shall either establish a shipyard rescue team or arrange for an outside rescue team that will respond promptly to a request for rescue service. Shipyard rescue teams shall meet the following criteria:

- Each employee assigned to the shipyard team shall be provided with and trained to use the personal protective equipment he or she will need, including respirators and any rescue equipment necessary for making rescues from confined and enclosed spaces and other dangerous atmospheres.
- Each employee assigned to the shipyard rescue team shall be trained to perform his or her rescue functions including confined and enclosed and other dangerous atmosphere entry.
- Shipyard rescue teams shall practice their skills at least once every 12 months. Practice drills shall include the use of mannequins and rescue equipment during simulated rescue operations involving physical facilities that approximate closely those facilities from which rescue may be needed.

Note: If the team performs an actual rescue during the 12 month period, an additional practice drill for that type of rescue is not required.

At least one person on each rescue team shall maintain current certification in basic first aid, which includes maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

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DMG shall inform outside rescue teams of the hazards that the team may encounter when called to perform confined and enclosed space or other dangerous atmosphere rescue at Bay Bridge Enterprise's facility so that the rescue team can be trained and equipped.

2.7.8 Exchanging Hazard Information Between Employers

Each employer whose employees work in confined and enclosed spaces or other dangerous atmospheres shall ensure that all available information on the hazards, safety rules, and emergency procedures concerning those spaces and atmospheres is exchanged with any other employer whose employees may enter the same spaces.

2.7.9 Cleaning and other cold work

Locations covered by this section

DMG shall ensure that manual cleaning and other cold work are not performed in the following spaces unless the conditions of this section have been met:

- Spaces containing or having last contained bulk quantities of combustible or flammable liquids or gases; and
- Spaces containing or having last contained bulk quantities of liquids, gases or solids that are toxic, corrosive or irritating.

Requirements for performing cleaning or cold work

Liquid residues of hazardous materials shall be removed from work spaces as thoroughly as practicable before employees start cleaning operations or cold work in a space. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel, or for shore-side operations, onto the surrounding work area.

Testing shall be conducted by a competent person to determine the concentration of flammable, combustible, toxic, corrosive, or irritant vapors within the space prior to the beginning of cleaning or cold work. Continuous ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration(s) of:

- Flammable vapor is maintained below 10 percent of the lower explosive limit; and
- Toxic, corrosive, or irritant vapors are maintained within the permissible exposure limits and below IDLH levels.

Note: Spaces containing highly volatile residues may require additional ventilation to keep the concentration of flammable vapors below 10 percent of the lower explosive limit and within the permissible exposure limit.

Testing shall be conducted by the competent person as often as necessary during cleaning or cold work to assure that air concentrations are below 10 percent of the lower explosive limit and

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within the PELs and below IDLH levels. Factors such as, but not limited to, temperature, volatility of the residues and other existing conditions in and about the spaces are to be considered in determining the frequency of testing necessary to assure a safe atmosphere.

Spills or other releases of flammable, combustible, toxic, corrosive, and irritant materials shall be cleaned up as work progresses.

An employee may not enter a confined or enclosed space or other dangerous atmosphere if the concentration of flammable or combustible vapors in work spaces exceeds 10 percent of the lower explosive limit.

Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment provided:

- No ignition sources are present;
- The atmosphere in the space is monitored continuously;
- The atmosphere in the space is maintained above the upper explosive limit; and
- Respiratory protection, personal protective equipment, and clothing are provided in accordance with the requirements of the DMG program.

A competent person shall test ventilation discharge areas and other areas where discharged vapors may collect to determine if vapors discharged from the spaces being ventilated are accumulating in concentrations hazardous to employees. If the tests indicate that concentrations of exhaust vapors that are hazardous to employees are accumulating, all work in the contaminated area shall be stopped until the vapors have dissipated or been removed.

Only explosion-proof, self-contained portable lamps, or other electric equipment approved by a National Recognized Testing Laboratory (NRTL) for the hazardous location shall be used in spaces described in paragraph (a) of this section until such spaces have been certified as "Safe for Workers."

Note: Battery-fed, portable lamps or other electric equipment bearing the approval of a NRTL for the class, and division of the location in which they are used are deemed to meet the requirements of this section.

DMG shall prominently post signs that prohibit sources of ignition within or near a space that has contained flammable or combustible liquids or gases in bulk quantities:

- At the entrance to those spaces;
- In adjacent spaces; and
- In the open area adjacent to those spaces.

All air moving equipment and its component parts, including duct work, capable of generating a static electric discharge of sufficient energy to create a source of ignition, shall

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be bonded electrically to the structure of a vessel or vessel section or, in the case of land-side spaces, grounded to prevent an electric discharge in the space. Fans shall have non-sparking blades, and portable air ducts shall be of non-sparking materials.

2.7.10 Hot Work

Hot work requiring testing by a Marine Chemist or Coast Guard authorized person

DMG shall ensure that hot work is not performed in or on any of the following confined and enclosed spaces and other dangerous atmospheres, boundaries of spaces or pipelines until the work area has been tested and certified by a Marine Chemist or a U.S. Coast Guard authorized person as "Safe for Hot Work":

- Within, on, or immediately adjacent to spaces that contain or have contained combustible or flammable liquids or gases.
- Within, on, or immediately adjacent to fuel tanks that contain or have last contained fuel; and
- On pipelines, heating coils, pump fittings or other accessories connected to spaces that contain or have last contained fuel.

Exception: On dry cargo, miscellaneous and passenger vessels and in the landside operations within spaces which meet the standards for oxygen, flammability and toxicity in 29 CFR 1915.12, but are adjacent to spaces containing flammable gases or liquids, as long as the gases or liquids have a flash point below 150° F (65.6° C) and the distance between such spaces and the work is 25 feet (7.5 m) or greater.

The certificate issued by the Marine Chemist or Coast Guard authorized person shall be posted in the immediate vicinity of the affected operations while they are in progress and kept on file for a period of at least three months from the date of the completion of the operation for which the certificate was generated.

Hot work requiring testing by a competent person

Hot work is not permitted in or on the following spaces or adjacent spaces or other dangerous atmospheres until they have been tested by a competent person and determined to contain no concentrations of flammable vapors equal to or greater than 10 percent of the lower explosive limit:

- Dry cargo holds,
- The bilges,
- The engine room and boiler spaces for which a Marine Chemist or a Coast Guard authorized person certificate is not required;
- Vessels and vessel sections for which a Marine Chemist or Coast Guard authorized person certificate is not required ; and
- Land-side confined and enclosed spaces or other dangerous atmospheres.

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If the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit in the space or an adjacent space where the hot work is to be done, then the space shall be labeled "Not Safe for Hot Work" and ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors or gases is below 10 percent by volume of the lower explosive limit. The warning label may be removed when the concentration of flammable vapors and gases are below 10 percent lower explosive limit.

2.7.11 Maintenance of safe conditions

Preventing hazardous materials from entering

Pipelines that could carry hazardous materials into spaces that have been certified "Safe for Workers" or "Safe for Hot Work" shall be disconnected, blanked off, or otherwise blocked by a positive method to prevent hazardous materials from being discharged into the space.

Alteration of existing conditions

When a change that could alter conditions within a tested confined or enclosed space or other dangerous atmosphere occurs, work in the affected space or area shall be stopped. Work may not be resumed until the affected space or area is visually inspected and retested and found to comply with 29 CFR 1915.12, 1915.13, and 1915.14, as applicable.

Note: Examples of changes that would warrant the stoppage of work include: The opening of manholes or other closures or the adjusting of a valve regulating the flow of hazardous materials.

Tests to maintain the conditions of a Marine Chemist's or Coast Guard authorized person's certificates

A competent person shall visually inspect and test each space certified as "Safe for Workers" or "Safe for Hot Work," as often as necessary to ensure that atmospheric conditions within that space is maintained within the conditions established by the certificate after the certificate has been issued.

Change in the conditions of a Marine Chemist's or Coast Guard authorized person's certificate

If a competent person finds that the atmospheric conditions within a certified space fail to meet the applicable requirements of 1915.12, 1915.13, and 1915.14 of this part, work in the certified space shall be stopped and may not be resumed until the space has been retested by a Marine Chemist or Coast Guard authorized person and a new certificate issued in accordance with 29 CFR 1915.14(a).

Tests to maintain a competent person's findings

After a competent person has conducted a visual inspection and tests required in 29 CFR 1915.12, 1915.13, and 1915.14 and determined a space to be safe for an employee to enter, he or

2.7 Confined Spaces

she shall continue to test and visually inspect spaces as often as necessary to ensure that the required atmospheric conditions within the tested space are maintained.

Changes in conditions determined by competent person's findings

After the competent person has determined initially that a space is safe for an employee to enter and he or she finds subsequently that the conditions within the tested space fail to meet the requirements of 29 CFR 1915.12, 1915.13, and 1915.14, as applicable, work shall be stopped until the conditions in the tested space are corrected to comply with 29 CFR 1915.12, 1915.13, and 1915.14, as applicable.

2.7.12 Warning signs and labels.

Employee comprehension of signs and labels

DMG shall ensure that each sign or label posted to comply with the requirements of this subpart is presented in a manner that can be perceived and understood by all employees.

Posting of large work areas

A warning sign or label required by paragraph (a) of this section need not be posted at an individual tank, compartment or work space within a work area if the entire work area has been tested and certified: not safe for workers, not safe for hot work, and if the sign or label to this effect is posted conspicuously at each means of access to the work area.

2.7.13 Compliance Assistance Guidelines

This final set of guidelines is provided to assist DMG in complying with the requirements of this Program. This guideline neither creates additional obligations nor detracts from obligations otherwise contained in the program, but is meant to summarize some of the more critical elements of the Program. It is also intended to provide explanatory information and educational material to DMG and its employees to foster understanding of, and compliance with, the standard.

Definition of "Hot work." There are several instances in which circumstances do not necessitate that grinding, drilling, abrasive blasting be regarded as hot work. Some examples are:

1. Abrasive blasting of the hull for paint preparation does not necessitate pumping and cleaning the tanks of a vessel.
2. Prior to hot work on any hollow structure, the void space should be tested and appropriate precautions taken.

Definition of "Lower explosive limit." The terms lower flammable limit (LFL) and lower explosive limit (LEL) are used interchangeably in fire science literature.

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Definition of "Upper explosive limit." The terms upper flammable limit (UFL) and upper explosive limit (UEL) are used interchangeably in fire science literature.

Oxygen

After a tank has been properly washed and ventilated, the tank should contain 20.8 percent oxygen by volume. This is the same amount found in our normal atmosphere at sea level. However, it is possible that the oxygen content will be lower. When this is the case, the reasons for this deficiency should be determined and corrective action taken. An oxygen content of 19.5 percent can support life and is adequate for entry. However, any oxygen level less than 20.8 percent and greater than 19.5 percent level should also alert the competent person to look for the causes of the oxygen deficiency and to correct them prior to entry.

Flammable Atmospheres

Atmospheres with a concentration of flammable vapors at or above 10 percent of the lower explosive limit (LEL) are considered hazardous when located in confined spaces. However, atmospheres with flammable vapors below 10 percent of the LEL are not necessarily safe. Such atmospheres are too lean to burn. Nevertheless, when a space contains or produces measurable flammable vapors below the 10 percent LEL, it might indicate that flammable vapors are being released or introduced into the space and could present a hazard in time. Therefore, the cause of the vapors should be investigated and, if possible, eliminated prior to entry. Some situations that have produced measurable concentrations of flammable vapors that could exceed 10 percent of the LEL in time are:

1. Pipelines that should have been blanked or disconnected have opened, allowing product into the space.
2. The vessel may have shifted, allowing product not previously cleaned and removed during washing to move into other areas of the vessel.
3. Residues may be producing the atmosphere by releasing flammable vapor.

Flammable atmospheres that are toxic

An atmosphere with a measurable concentration of a flammable substance below 10 percent of the LEL may be above the OSHA permissible exposure limit for that substance. In that case, refer to 29 CFR 1915.12(c) (2), (3), and (4).

The frequency with which a tank is monitored to determine if atmospheric conditions are being maintained is a function of several factors that are discussed below:

1. Temperature. Higher temperatures will cause a combustible or flammable liquid to vaporize at a faster rate than lower temperatures. This is important since hotter days may cause tank residues to produce more vapors and that may result in the vapors exceeding 10 percent of the LEL or an overexposure to toxic contaminants.

2.7 Confined Spaces

2. Work in the tank. Any activity in the tank could change the atmospheric conditions in that tank. Oxygen from a leaking oxy-fuel hose or torch could result in an oxygen-enriched atmosphere that would more easily propagate a flame. Some welding operations use inert gas, and leaks can result in an oxygen-deficient atmosphere. Manual tank cleaning with high pressure spray devices can stir up residues and result in exposures to toxic contaminants. Simple cleaning or mucking out, where employees walk through and shovel residues and sludge, can create a change in atmospheric conditions.
3. Period of time elapsed. If a period of time has elapsed since a Marine Chemist or Coast Guard authorized person has certified a tank as safe, the atmospheric condition should be rechecked by the competent person prior to entry and starting work.
4. Unattended tanks or spaces. When a tank or space has been tested and declared safe, then subsequently left unattended for a period of time, it should be retested prior to entry and starting work. For example, when barges are left unattended at night, unidentified products from another barge are sometimes dumped into their empty tanks. Since this would result in a changed atmosphere, the tanks should be retested prior to entry and starting work.
5. Work break. When workers take a break or leave at the end of the shift, equipment sometimes is inadvertently left in the tanks. At lunch or work breaks and at the end of the shift are the times when it is most likely someone will leave a burning or cutting torch in the tank, perhaps turned on and leaking oxygen or an inert gas. Since the former can produce an oxygen-enriched atmosphere, and the latter an oxygen-deficient atmosphere, tanks should be checked for equipment left behind, and atmosphere, monitored if necessary prior to re-entering and resuming work. In an oxygen-enriched atmosphere, the flammable range is severely broadened. This means that an oxygen-enriched atmosphere can promote very rapid burning.
6. Ballasting or trimming. Changing the position of the ballast, or trimming or in any way moving the vessel so as to expose cargo that had been previously trapped, can produce a change in the atmosphere of the tank. The atmosphere should be retested after any such move and prior to entry or work.

Hot work

This is a reminder that other sections of the OSHA shipyard safety and health standards in part 1915 should be reviewed prior to starting any hot work. Most notably, Subpart D, Welding, Cutting and Heating, places additional restrictions on hot work: The requirements of 1915.51 and 1915.53 must be met before hot work is begun on any metal that is toxic or is covered by a preservative coating respectively; the requirements of 1915.54 must be met before welding, cutting, or heating is begun on any structural voids. During hot work, more than 20.8 percent oxygen by volume can be unsafe since it extends the normal flammable range. The standard permits the oxygen level to reach 22 percent by volume in order to account for instrument error. However, the cause of excess oxygen should be investigated and the source removed.

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CONFINED SPACE PERMIT & PROCEDURES FOR ENTRY

Confined Space Name:		No.
Confined Space Location:		Date:
Entry Authorized By:	Time Issued:	Time expires:

Reason(s) for Entry	Hazards

ISOLATION

Equipment to Lock/Tag/Test (including blocking, blanking, and/or disconnecting electrical, hydraulic, pneumatic, kinetic, thermal, steam, chemical, springs):

Equipment Name:	Isolated by:	Location:	Done

ENTRY REQUIREMENTS:	Required	Checked		Required	Checked
Eye Protection			Hot Work Permit		
- Safety Glasses			Communications		
- Goggles			Air Mover(s)		
- Face Shield			Rescue Hoist and Other Related Equipment		
Hearing Protection			Rescue Lanyard		
Fall Protection			GFCI Protected Electrical		
Respiratory Protection			Explosion Proof Lighting/Electrical		
- 1/2 Face Disposable			Non-sparking Tools		
- 1/2 Face Cartridge			Ladders		
- Full Face			Blocking/Blanking Equipment		
- Powered Air Purifying			Air Monitoring		
- Supplied Air			- Oxygen		
Gloves Type			- Combustibles		
Boots Type			- Carbon monoxide		
Clothing Type			- Hydrogen sulfide		
Hard Hat			- Dust		
Other			- Other		

Comments:

Pre-Entry		Continuous		Record readings every 30 minutes (minimum)			
Atmospheric Testing	Needed	Time: Results/Initials	Needed	Time: Results/Initials	Time: Results/Initials	Time: Results/Initials	Time: Results/Initials
Oxygen (19.5-23.5%)							
Combustibles(<10%LEL)							
Carbon Monoxide (<35 ppm)							
Hydrogen Sulfide (<2 ppm)							
dust (visibility > 10')							
other							
other							

Note: Sign the permit and authorize entry only when the atmospheric conditions meet the permissible entry levels shown for a minimum period of 30 minutes prior to entry.

Name of Tester:

Signature:

Testing Equipment Used	Type	Model	I.D. Number

Emergency Action Plan:

Authorization	Signature	Time/Date
Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Relief Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Entrants(s): (print)		
Attendant(s): (print)		

Permit Canceled by: _____ Date: _____ Time: _____
 Permit was cancelled because (check one): (i) Work has been completed _____ (ii) The permit has expired _____ (iii) Emergency (specify) _____

2.8 Lead Abatement

Employees

- Know the potential locations of lead onboard the vessel.
- Understand and follow the requirements of the Lead Hazard Control Plan.
- Do not enter an area where lead abatement is occurring unless you have been trained and licensed in the proper procedures for lead removal.
- Wear proper protective clothing and equipment where lead abatement is taking place.
- Place lead-containing waste in the proper disposal containers. DO NOT mix lead waste with any other type of waste.

Employer

- Ensure that all employees involved in paint removal or paint stabilization work have been trained and licensed in accordance with OSHA and State requirements.
- Understand and implement the provisions of the Lead Hazard Control Plan.
- Provide proper personal protective equipment to the appropriate personnel. Ensure that these employees have been trained on the proper use of the equipment and that the equipment is properly used and cared for.
- Perform medical monitoring for all employees as stipulated by OSHA. Maintain the medical records for each employee for 40 years or for the duration of employment plus 20 years, whichever is longer.
- Ensure that waste is disposed of in proper containers. Do not mix lead-contaminated waste with any other type of waste.
- Notify employees of the results of any medical screening and monitoring results within 5 working days.

2.8.1 Regulatory Compliance

Environmental Protection Agency (EPA)

The EPA regulates the removal and disposal of lead under EPA Guidelines for the Land Disposal of Solid Wastes found at 40 CFR 241.

Occupational Safety and Health Administration (OSHA)

OSHA regulates the removal and disposal of lead under 29 CFR 1910.1025, “Toxic and Hazardous Substances - Lead” and 29 CFR 1915.1025, “Toxic and Hazardous Substances - Lead.”

Commonwealth of Virginia

- Virginia Lead-Based Paint Activities Regulations; Title 54.1, Chapter 5.
- Virginia Waste Regulations:
 - Chapter 60 – Hazardous Waste
 - Chapter 80 – Solid Waste

2.8 Lead Abatement

- Chapter 110 – Transportation of Hazardous Materials.

2.8.2 Possible Locations of Lead

Lead as used in this program means metallic lead, all inorganic lead compounds, and organic lead soaps. All other organic lead compounds are excluded. Lead's abundance, low melting point, high molecular weight, high density, and malleability make it a useful structural material. When added to resin, grease, or rubber, lead compounds act as antioxidants. Items that commonly contain lead on vessels may include:

- (1) Primer Paints
- (2) Paint filler and hardener
- (3) Rubber antioxidant
- (4) Painted wood products
- (5) Solder for electrical components and pipe joints
- (6) Painted metal products
- (7) Roof flashing.

While not an absolute indicator, red, forest green, chrome yellow, "school bus yellow," and "OSHA yellow" paints typically contain lead components, such as lead oxides and lead chromate. Lead is also found in polyurethane and water base paints.

These items will be tested in accordance with the sampling methodology outlined in the next section to determine what amount of lead, if any, are contained in these items before their removal.

Exposure to lead may occur during one of the following operations:

- Material handling (lead painted)
 - Spraying, sanding, grinding, burning, welding, cutting, and abrasive blasting of lead containing materials and paint
- Soldering with torches
- Abrasive blasting with smelting slag
- Contaminated personnel clothing, etc.

2.8.3 Methods for Determining the Presence of Lead

Sample Methodology

Items identified above that require either paint stabilization or paint removal will be analyzed to determine the presence of lead.

2.8 Lead Abatement

Tests/Analysis to be Performed

The primary means by which painted surfaces will be evaluated for the presence of lead will be X-Ray Fluorescence (XRF). Only those individuals who have been trained and certified in the use of such equipment will be permitted to perform evaluations for lead-based paint/coatings.

The following laboratory tests may and/or will be performed for paints or coatings that did not provide conclusive results by XRF:

NIOSH 7300, 7082, and 7105, where applicable.

Only those individuals who have been trained and licensed in accordance with State Lead-Based Paint regulations will perform evaluations of painted surfaces.

Laboratories Performing Analysis

The following analytical laboratory has been identified as one that is qualified to analyze samples for the presence of lead:

Schneider Laboratories, Inc.
2512 West Cary Street
Richmond, VA 23220-5117

Phone: 804-353-6778
Fax: 804-353-6928

Schneider Laboratories is fully accredited and licensed to perform analysis for lead.

2.8.4 Lead Removal/Disposal

Removal

The following contractor will be performing paint stabilization and/or removal:

EC&C
4434 Gulls Way
Virginia Beach, VA 23455
(757) 464-0044

All DMG employees and contractors will follow the lead exposure guidelines and procedures outlined below.

2.8 Lead Abatement

PEL

The PEL for an 8-hour time weighted average (TWA) exposure to airborne lead is 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of air. If an employee is exposed for more than 8 hours in a workday, the PEL will be determined by the following formula.

$$\text{PEL } (\mu\text{g}/\text{m}^3) = 400/\text{No. Hours Worked per Day}$$

When an employee's exposure exceeds the PEL for more than 30 days per year, engineering and administrative controls will be implemented to the extent feasible to reduce the exposure to below the PEL. Where such controls are not feasible, they, nevertheless, will be used to lower exposure to the maximum extent possible and will be supplemented with respiratory protection. Where an employee is exposed to lead above the PEL for 30 days or less per year, engineering controls will be used to reduce exposures at least to $200 \mu\text{g}/\text{m}^3$, but thereafter, any combination of engineering, work practice, and respiratory controls may be used to reduce employee exposure to or below $50 \mu\text{g}/\text{m}^3$.

Action Level (AL)

The AL for an 8-hour TWA exposure to airborne lead is $30 \mu\text{g}/\text{m}^3$ (without regard to respirator use). Exposure to airborne lead at or above the AL will trigger the following requirements:

Biological monitoring and medical surveillance will be initiated when an employee's exposure exceeds the AL for more than 30 days per year.

Controls

The basic principles for controlling hazards in the occupational environment include substitution with less hazardous materials, engineering controls (ventilation), administrative controls (job rotation, work time limits), and use of personal protective equipment (PPE); in that order.

General Workplace Control Practices

- (1) A Lead Hazard Control Plan will be developed and implemented for use at the project site.
- (2) Hot operations (torch and welding operations on lead containing materials), abrasive operations, and handling of bulk lead coated materials are of primary concern because they can generate large amounts of respirable lead.
- (3) Work surfaces will be maintained as free of lead dust as is practical. Such dust will be cleaned up with high efficiency particulate air (HEPA) filtered vacuum cleaners. Wet sweeping may not be used under any circumstances.
- (4) Lead containing waste, scrap, debris, containers, equipment, and clothing consigned for disposal, which may generate airborne lead concentrations in excess of the PEL or produce water pollution, will be collected, sealed, and labeled in impermeable containers per Environmental Protection Agency (EPA) requirements, and state and local regulations.

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- (5) To minimize exposure potential, hot work on lead and abrasive lead removal operations will, to the extent feasible, be isolated from other operations.

Ventilation

Local exhaust ventilation is frequently required to ensure that atmospheric levels of lead particulate do not exceed the PEL. General requirements for the design and use of ventilation to reduce exposures are listed below. Specific guidance for each lead operation will be obtained from the DMG Safety Officer.

To the maximum extent possible, a local exhaust system will be provided at the point of airborne particulate generation. Capture velocities will be high enough to entrain generated particulates under the specific environmental conditions. Duct transport velocities will be high enough to prevent accumulation of particulates in the duct, and clean-out points will be provided for periodic maintenance. The recommendation or approval of specific equipment design parameters, as well as protective clothing, respiratory protection, and system servicing procedures for each operation will be provided by the DMG Safety Officer.

Local exhaust ventilation and dust collection systems will be designed, constructed, installed, and maintained per 29 CFR 1910.94; "Industrial Ventilation: A Manual of Recommended Practice," published by ACGIH; and ANSI Z9.21979.

Ventilation systems, used to control lead exposures or emissions, will be tested by the site safety officer personnel at least every 3 months and within 5 days of any production, process, or control change which may result in a change in employee exposure. Test records will be retained for 30 years. Where devices such as manometers, pitot tubes, etc. are installed to continuously monitor the effectiveness of ventilation systems, employees who use the system will be instructed on the meaning and importance of the measurements and to immediately contact their safety office if the measuring devices indicate a malfunction. Where such devices are in place, safety personnel need inspect the ventilation systems only annually.

Ventilation systems used to control occupational exposures of emissions will not be directly exhausted into any work space or to the atmosphere. Recirculation of air from operations generating lead is not permitted. Exhaust filtration systems must be maintained to prevent performance degradation of the ventilation system as a whole.

Personal Protective Clothing and Related Control Facilities

Personnel engaged in the handling of lead, or in situations where the concentration of airborne lead particulates is likely to exceed the PEL or where the possibility of skin or eye irritation exists, will remove clothing worn to and from work and wear the protective clothing provided by DMG. Clothing will be waterproof when wet lead is handled. Protective clothing includes:

2.8 Lead Abatement

- Full *body, one-piece coveralls supplied* and laundered by a DMG contractor will be used. One-piece disposable coveralls made of TYVEK™ material (or equivalent) may also be used.
- Durable gloves and head covering will be used. Hoods (head covering) will extend beyond the collar of the coverall, completely protecting the neck area.
- Slip resistant shoe covers or lightweight rubber boots will be provided. Disposable shoe covers may also be used.
- Face shields, vented goggles, or other appropriate protective equipment will be provided and used whenever the possibility of eye irritation exists.
- The proper use of protective clothing requires that all openings be closed and that garments fit snugly about the neck, wrists, and ankles. Accordingly, the wrist and ankle junctions, as well as the collar opening on coveralls will be taped, as necessary, to prevent contamination of skin and underclothing without restricting physical movement. Clean protective clothing will be provided at least weekly and will be provided daily when the 8-hour TWA airborne concentration exceeds 200 µg/m³.

Change rooms are provided as close as practical to the lead work area(s) for employees who work where the airborne lead exposure is above the PEL (without regard to the use of respirators). Change rooms are maintained under positive pressure with respect to adjacent lead work areas. Protective clothing removal procedures will be posted in the change room and include vacuuming of clothing (before removal and while still wearing a respirator, if one was required for the task) using a HEPA filter vacuum. Removal of lead particles from cloth by blowing or shaking is prohibited.

Employees exposed to airborne lead concentrations above the PEL (without regard to respirator use) will shower at the end of the work shift when showers are provided. Shower facilities will be located between the clean and dirty change rooms for employees to shower at the end of their work shift. Change rooms areas will be provided and will have two separate clothing lockers to prevent contamination of street clothes and to ensure that employees do not leave wearing any clothing or equipment worn during their work shift. Supervisors will ensure that employees at a minimum wash their face and hands at the end of their work shift.

Laundering of lead contaminated clothing will be done to prevent release of lead dust in excess of the AL. Contracts governing laundering of lead contaminated clothing will specifically require that contractors comply with the precautions specified in this program. Lead contaminated clothing will be transported in sealed containers to which are affixed the standard "caution label". Persons who clean or launder protective clothing or equipment will be notified in writing of the potentially harmful effects of exposure to lead.

Respiratory Protection

Limits of Respirator Usage

Engineering control measures will be used per paragraph 1-3. Compliance with PELs will not be achieved solely by the use of respirators except under the following conditions:

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- During the time period necessary to implement engineering control measures;
- In work situations in which the control methods prescribed are not technically feasible or are not sufficient to reduce the airborne concentration of lead particulates below the PEL.
- During emergencies.

A respirator program will be established as described in 29 CFR 1910.134. Where a respirator is required, it will be National Institute for Occupational Safety and Health and Mine Safety and Health Administration approved. Qualitative fit tests will be required for all respirator users at the time of initial fitting and at least every six (6) months thereafter for all users of negative pressure respirators. Fit tests will be conducted under the guidelines provided in reference Breathing air or sources of breathing air for supplied air respirators or self-contained breathing apparatuses (SCBAS) will comply with the requirements in 29 CFR 1910.134. An employee will not be assigned to tasks requiring the use of a respirator if, base upon the employee's most recent medical examination, documentation reveals that the employee will be unable to function normally wearing a respirator or that the safety or health of the employee will be impaired by his/her use of a respirator. A powered air-purifying respirator with HEPA filter will be provided in lieu of a half full-face piece respirator if the employee chooses to use this respirator and it provides adequate protection. A respirator will be provided to employees who work with lead, upon request. Such employees will be entered into the respiratory protection program.

Respirator Selection

Respirator selection will be per Table I of 29 CFR 1910.1025.

Housekeeping

Where lead-containing materials are routinely accumulated, all surfaces will be maintained as free as practical of lead accumulation. Surfaces will be cleaned at least once per shift to prevent accumulation of lead dust or more frequently, if necessary. All cleaning will use methods, such as vacuuming with HEPA filtered vacuum cleaners or washing down, where feasible, observing water pollution regulations as they pertain to lead contaminated wastewater. Wet sweeping, shoveling, or brushing will be used when other methods have been tried and found to be ineffective or unfeasible. Compressed air will NOT be used to clean work surfaces or floors.

Lunch Areas and Personal Hygiene

Separate lunch areas will be established for employees who work in areas where their airborne lead exposure is above the PEL (without regard to the use of respirators). Protective clothing and equipment will be removed before entering lunchroom facilities. Eating, drinking, chewing or smoking of tobacco products, the application of makeup, and storage of food and tobacco products will be prohibited in lead work areas. Clothing worn during lead work will not be

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cleaned by blowing down with compressed air or by shaking. Lead workers will wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.

Training

All personnel who work in areas where the potential exists for lead exposure will receive initial training prior to or at time of assignment and at least annually thereafter. The training will include, as a minimum, the following:

- The specific nature of the operations during which exposure is possible
- The purpose, proper selection, fit testing, use, and limitations of respirators
- The adverse health effects of lead with particular attention to the reproductive effects upon both males and females
- The purpose and description of the medical surveillance program, including the use of chelating agents and medical removal protection benefits.
- The engineering controls and work practices to be applied and used in the employee's job, including PPE and personal hygiene measures
- The contents of the compliance program.

Industrial Hygiene Surveillance

Each jobsite will be evaluated at the beginning of each project, or more frequently, if necessary, where lead is used and will reevaluate the operation within 5 working days of any work process or control change. Where a potential for exposure from inhalation of airborne lead particulate or personnel contamination is found, a workplace monitoring plan will be established to characterize exposures for every employee occupationally exposed. In this regard, both personal (employee) air sampling and environmental (area) monitoring are necessary and will be conducted for at least 7 continuous hours. Personal air samples will be collected in the breathing zone of the employee per this section. Area monitoring will include air sampling adjacent to the operation.

Positive Initial Evaluation

When the initial worksite evaluation indicates that personnel may be exposed at or above the AL, the procedures below will be initiated.

- Operations having airborne lead concentrations exceeding the AL but not the PEL will be monitored as follows:
 - Operations which occur at least once every 6 months will be monitored at intervals of 6 months or less until two consecutive sample sets, collected at least 7 days apart, indicate that other sampling frequencies found in this section are appropriate.
 - Operations which occur at intervals greater than 6 months will be monitored whenever they occur until two sample sets, collected at least 7 days apart, indicate that other sampling frequencies found in this section are appropriate.

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- Operations having lead concentrations exceeding the PEL will be monitored as follows:
 - Operations which occur at least once every 3 months will be monitored at three-month intervals or shorter until two consecutive sample sets, collected at least 7 days apart, indicate that other sampling frequencies found in this section are more appropriate.
 - Operations which occur at intervals greater than 3 months will be monitored whenever they occur until two consecutive sample sets, collected at least 7 days apart, indicate that other sampling frequencies found in this section are more appropriate.

If, subsequent to a positive initial determination, the institution of controls reduces employee exposures to below the AL, as evidenced by two consecutive sample sets collected at least 7 days apart, then monitoring may be discontinued.

Negative Initial Determination

When the initial worksite evaluation indicates that personnel have not been exposed at or above the AL, the monitoring need not be repeated.

Records

All environmental and personal air sampling records will be retained for the period of employment plus 20 years, whichever is greater. Each individual currently or previously employed by DMG, or any other person he/she may designate, will have access to all such records within 15 days of the request. Refer to 29 CFR 1910.1025 for additional guidance.

Employee Notification

Within 5 working days after the receipt of monitoring results, DMG will notify each employee in writing of the results that represent that employee's exposure. Whenever the results indicate that the employee was exposed above the PEL, without regard to respirator use, the written statement will include that fact and a description of the corrective action(s) taken to reduce the individual's exposure.

Medical Surveillance Program

General

This program consists of three basic elements:

- (1) Preplacement medical evaluation
- (2) Semi-annual blood lead monitoring

2.8 Lead Abatement

- (3) Follow-up medical evaluations and blood lead analysis based on the results of blood lead analysis and physician opinion.

Personnel will be included in this program when industrial hygiene surveillance indicates that they perform work or are likely to be in the vicinity of an operation which generates airborne lead concentrations at or above the AL 30 days per year. Examinations may include special purpose histories and physical examinations, and laboratory tests designed to detect early signs of lead overabsorption. Inclusion in this program is based on measured airborne concentrations without regard to respirator use and, therefore, does not indicate that an individual is overexposed to lead.

Program Elements

1. **Preplacement Evaluation.** All personnel will receive a preplacement evaluation prior to assignment to a position involving potential exposures to lead that equal or exceed the AL. This evaluation will include, as a minimum, the following:
 - A comprehensive occupational and medical history, detailing prior exposure to potentially harmful chemical or physical agents, particularly lead. Any adverse effects related to these exposures will also be recorded.
 - A physical examination with particular attention to neurological, gastrointestinal, and cardiovascular systems.
 - Blood analysis to include:
 - Blood lead analysis.
 - Complete blood count (CBC) with differential hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral blood smear to evaluate blood morphology.
 - Blood urea nitrogen (BUN).
 - Serum creatinine.
 - Zinc protoporphyrin.
 - Routine urine analysis with microscopic examination.
 - Respiratory Fitness for Duty. A judgment of the individual's ability to perform a required job while wearing respiratory protection equipment. This requirement only applies to those individuals whose current work will expose them to lead at or above the AL. The finds of severe respiratory impairment from any cause, e.g., forced expiratory volume in 2 seconds/forced vital capacity (FEV_i/FVC) less than 45 percent, FVC less than 70 percent of predicted, or evidence of lead intoxication will be considered disqualifying for initial assignment. Any other abnormalities discovered in the course of the preplacement evaluation should be investigated to determine if they could substantially increase the risk from lead intoxication.

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2. **Blood Lead Levels and Frequency of Monitoring.** Blood lead analysis and ZPP will be performed every six months for all personnel who are or may be exposed to lead above the AL for more than 30 days per year. Analysis will be performed every 2 months when the blood lead level exceeds 30 µg/100g of whole blood.

Follow-up Medical Surveillance

- a. **Medical Removal.** If an employee's blood lead concentration equals or exceeds 60 µg/100 g, or the average of his/her last three blood lead measurements equals or exceeds 50 µg/100 g, or the employee has signs or symptoms of lead toxicity, the employee will be reassigned to other non-lead work. For additional guidance concerning removal procedures, return to job status, and removal protection requirements, refer to reference L-4. Pregnant women exposed to lead at or above 50 µg/m³ or with a blood lead level of 30 µg/mg blood will be reassigned to a job without lead exposure, with medical removal benefits.
- b. **Follow-up Blood Lead Monitoring.** Follow-up lead monitoring will be performed within 2 weeks of the receipt of an initial or routine monitoring result with a blood lead concentration at or above 30 µg/mg of whole blood, and periodically thereafter according to the following criteria.
 1. During medical removal (to non-lead work activity), the employee's blood lead concentration will be monitored monthly until the employee's last two consecutive tests are at or below 40 µg/100 g, at which time the employee may be returned to his/her regular work activity.
 2. When an employee's blood lead concentration is between 30 and 40 µg/100 g, it will be monitored every 2 months until the last two consecutive blood tests are less than 30 µg/100 g.
- c. **Follow-up Evaluations**
 1. **Medical Follow-up.** A medical evaluation identical to the preplacement evaluation, with the exception of chest x-rays, will be conducted annually for each person found to have a blood lead concentration at or above 30µg/mg at any time during the prior year.
 2. **Reassignment/Termination or Employment Follow-up.** A medical evaluation identical to the preplacement evaluation will be conducted just prior to the reassignment or termination of an employee from a job requiring medical surveillance.
 3. **Physicians Written Opinion.** A written opinion is required.
 4. **Industrial Hygiene Follow-up Investigation.** The safety officer will be notified of, and perform an investigation to determine the cause of each blood lead concentration at or above 30 µg/100 g which has been verified by follow-up blood lead monitoring.

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- d. **Other Appropriate Medical Evaluations.** A medical examination, including those elements of the preplacement examination which the physician deems necessary, will be performed:
- As soon as possible after notification by an employee that he/she has developed signs or symptoms commonly associated with lead intoxication.
 - As soon as possible after notification that the employee desires medical advice concerning the effects of current or past lead exposure on the ability to procreate a healthy child.
 - As soon as possible after being informed that the employee has demonstrated difficulty breathing during a respirator fit test or during respirator use.
 - As medically appropriate for personnel who have been removed from exposure to lead due to risk of sustaining material impairment to health, or otherwise limited pending a final medical evaluation.
- e. **Administrative Procedures**
1. **Employee Notification.** The employee will be notified of the following, in writing, within 5 working days after receipt of results, when his/her blood lead level is at or above 30 µg/100 g whole blood:
 - (a) His/her blood lead concentration level, as reported; and
 - (b) That the regulations require temporary medical removal with Medical Remove Protection benefits when, and if, the employee's blood level exceeds the current numerical criterion for medical removal under 29 CFR 1910.1025.
 2. **Employee Counseling.** Personnel will be counseled regarding any abnormalities detected during any screening test. The physician will make an entry into the employee's medical record that describes the counseling given-. The employee will countersign this entry.
- f. **Medical Records**
1. Each employee record will include the following identifying information:
 - Name;
 - Social security number;
 - Date of birth; and
 - Dates of examinations.
 2. All records of examinations, possible lead related conditions, related laboratory results, and all forms and correspondence related to the employee's medical history will become a permanent part of the health record and be retained for the period of employment plus 20 years.

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3. The judgment of the occupational health physician concerning the adequacy of the diagnostic information to support the impression of lead related disease will be entered in the medical record. Lacking definitive information, the evaluating physician must exercise his/her best medical judgment on each medical case.
4. Copies of any examinations, laboratory results, or special studies in an employee's health record or compensation folder will be made available to them after execution of a proper release of information form.
5. The employee may designate a second physician to review any findings and conduct independent examinations and tests as may be deemed necessary. DMG will provide the initial and consulting physician the following:
 - Description of employee's duties
 - Employee's exposure level
 - Description of PPE
 - Blood lead determinations
 - All prior written medical opinions.
6. Each individual currently or previously employed by DMG or any other person he/she might designate will have access to the records within 15 days of the request.

Work Performed by Private Contractors.

Contract administrators will ensure that each contract, for work performed by private contractor that may involve worker lead exposures, will incorporate appropriate references and clauses to ensure that:

- a. The contractor is made aware of the potential hazard to his/her employees and other personnel.
- b. The contractor will comply with 29 CFR 1910.94, 29 CFR 1910.1025, and 29 CFR 134 to protect his/her employees as well as other personnel.
- c. The contractor will measure and control lead dust outside of the work boundary to less than 30 µg/m³ at all times. In addition, the controlled work area(s) will meet these criteria prior to release for unrestricted access. Copies of the contractor's monitoring results will be provided to the cognizant industrial hygienist.

Responsibilities

The following responsibilities are assigned to provide an effective lead exposure control program throughout the company.

- a. The Environmental Safety Manager will:
 - Centrally manage the Lead Compliance Program; and
 - Provide professional safety officer with technical support and training assistance for the purpose of evaluating the potential for lead exposure.

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b. Field Supervisors

- Control measures and monitoring procedures prescribed in this program are allied to processes using lead or lead containing materials.

Disposal

Care must be taken to ensure that measures taken to meet local and national emission standards are compatible with requirements contained in this program, particularly with regard to collection devices and disposal procedures involved in removal of lead coating and hot work on lead coated surfaces. Lead containing materials classified as hazardous waste (HW) will be handled per 40 CFR 241, "Guidelines for the Land Disposal of Solid Wastes." The disposal of hazardous lead waste required bagging in heavy duty plastic bags or other impermeable containers which must be provided with caution labels described in paragraph 1-3.e. Lead waste containers such as bags, trash cans, dumpsters, etc., will be labeled "LEAD WASTE ONLY". Care will be exercised to prevent bags and other containers from rupturing when being moved to a dumpster or other suitable vehicle for transport to a HW disposal site.

Lead materials, properly contained and disposed of in an approved HW landfill, should not pose a hazard to human health or the environment. Specific locations within landfills used for the disposal of lead materials will be recorded by the landfill operators with a permanent record retained by DMG. This practice should reduce the possibility of future unearthing and rupturing of disposal containers.

Labeling/Marking

Warning signs will be provided and displayed at each location where airborne lead concentrations may exceed the PEL. Signs will be posted conspicuously posted so personnel may read the signs and take necessary precautions before entering the area. Signs will be illuminated, as necessary, and free of statements that detract from their intent. Signs, in compliance with 29 CFR 1915.1025, may contain a listing of required protective equipment and will state, as a minimum, the following:

**WARNING
LEAD WORK AREA
POISON
NO SMOKING, EATING, OR DRINKING**

Caution labels will be affixed to containers of contaminated clothing, equipment, raw materials, waste, debris, or other products containing lead if, in any foreseeable way, levels of airborne lead could be produced which might constitute a threat to health. These caution labels will state:

**CAUTION
CLOTHING CONTAMINATED WITH LEAD
DO NOT REMOVE DUST BY BLOWING OR SHAKING
DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH
APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS**

2.8 Lead Abatement

2.9 Asbestos Abatement

Process Control Procedures for Asbestos

Employees

- Do not perform any work in an area that has not been cleared as being asbestos-free.
- Do not enter an area where asbestos removal is taking place unless you are authorized, and proper personal protection is worn.
- Do not enter an area where asbestos removal is taking place unless you have had proper training.
- Know the potential locations of asbestos onboard the vessel.
- If a material that could contain asbestos is identified, do not disturb it and notify your supervisor immediately.
- Place asbestos-containing waste in the proper disposal containers. DO NOT mix asbestos waste with any other type of waste.

Employer

- Perform a survey to determine the location and quantity of all asbestos-containing materials (ACM) before any other work is performed that may damage or disturb these materials.
- Abate all ACM before performing work that may disturb or dislodge asbestos materials.
- Provide proper personal protective equipment to affected employees. Ensure that these employees have been properly trained on the use of the equipment and that the equipment is properly used at all times.
- Restrict access to all areas where asbestos removal is taking place. Do not allow employees who have not received proper training to enter abatement areas.
- Train all employees who could potentially need to enter abatement areas on the proper procedures to do so.
- Conduct periodic monitoring to determine the exposure levels of asbestos that workers are being subject to. Inform employees of the results of the monitoring as soon as feasible following the receipt of results.
- Provide for the proper waste disposal facilities.
- Maintain records that document the monitoring which has been performed, including date, area, and results of monitoring.

2.9.1 Definitions

- "Authorized person" means any person authorized by the employer and required by work duties to be present in regulated areas.
- "Class I asbestos work" means activities involving the removal of thermal system insulation and surfacing ACM and PACM.
- "Class II asbestos work" means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the

2.9 Asbestos Abatement

removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, gaskets and packing material, and construction mastics.

- "Class III asbestos work" means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.
- "Class IV asbestos work" means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.
- "PACM" means presumed asbestos containing material.
- "Permissible Exposure Limit" means 0.1 fibers per cubic centimeter of air (f/cc) reported as an 8 hour time weighted average (TWA) exposure concentration.
- "Regulated Area" means an area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed, or can reasonably be expected to exceed, the permissible exposure limit.
- "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

2.9.2 Regulatory Agencies

EPA

The US EPA regulates the removal and disposal of asbestos under 40 CFR Part 61--National Emission Standards for Hazardous Air Pollutants - -Subpart M--National Emission Standard for Asbestos, and through 40 CFR 763--Asbestos Model Accreditation Plan.

Occupational Safety and Health Administration (OSHA)

Asbestos removal and disposal as part of a shipbreaking operation is regulated by 29 CFR 1915.1001 (*Asbestos Standard for Shipyard Employment*)

VA DEQ

The VA DEQ regulates and oversees the removal and disposal of asbestos Applicable Regulations: Title 54.1, Chapter 5 – Asbestos Licensing Regulations

2.9.3 Possible Locations of Asbestos

Items aboard a vessel that could potentially contain asbestos include:

- pipe, boiler, and other thermal systems insulation
- gaskets and packing (at pipe flanges and valve assemblies)
- cable insulation

2.9 Asbestos Abatement

- other insulating, fireproofing, or sound deadening materials

These items will be tested in accordance with the sampling methodology outlined in the next section to determine what amount of asbestos, if any, is contained in these items before their removal.

2.9.4 Methods for Determining the Presence of Asbestos

Sample Methodology

The following procedures will be used as guidelines for the identification of Asbestos Containing Materials (ACM) on board ships to be cleaned and prepared for dismantlement or sinking by DMG. This procedure is intended to serve as a guide for compliance with applicable federal, state, and local regulations concerning the handling of ACM and the potential of DMG employees or its subcontractors to be exposed to friable ACM. Compliance with this guidance document in no way guarantees compliance with federal, state, and local regulations.

No portion, compartment, or component of any vessel planned for dismantling by DMG will be removed, cut, salvaged, or otherwise physically disturbed until that portion of the vessel has been inspected for the presence of friable ACM, and that any ACM such identified has been removed from the vessel.

Our plan for the identification will include the following:

Each compartment of the vessel affected by cleaning operations will be systematically inspected for the presence of ACM as needed. The compartment will be inspected visually, with the inspector performing an inventory of observed suspect materials along the way. The materials inventory will include material descriptions, locations, and estimated quantities. If available, a deck plan of the vessel will be used as a guide.

If the inspector determines that a compartment contains suspect ACM, then the material will be sampled and submitted for laboratory analysis.

The inspection of the vessel will proceed in the manner described above until each compartment of the vessel has been visually inspected and samples for suspect materials collected. Upon completion of the inspection, bulk samples of suspect materials will be submitted to an accredited laboratory for analysis.

Once the laboratory results for all sampled materials have been reported to DMG, DMG will review the results to determine which materials tested positive for asbestos (greater than 1% asbestos by Polarized Light Microscopy (PLM) analysis). Positive samples will be compared to the materials inventory generated during the inspection, so that a final list of all identified ACM can be developed.

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The final list will produce an inventory of ACM aboard the ship, listed by compartment, deck, and/or frame number. The inventory, complete with estimated material quantities and material locations, will serve two purposes.

The inventory will provide DMG with a list of compartments for which no recycling will be performed until all ACM has been removed from those respective compartments.

The inventory will provide DMG with a schedule of materials to be removed from the ship, which can be used as a Scope-of-Work for perspective asbestos abatement contractors.

Once identified, all ACM will be conspicuously marked with paint so that they may be easily identified by other DMG employees, contract employees, and anyone else who boards the vessel.

Some areas of a vessel (e.g., engine rooms, boiler rooms and other compartments with significant amounts of piping) may not be sampled in their entirety since the economic impact of the inspection effort may outweigh the cost for removing all suspect materials. In these cases, all suspect materials in a respective compartment will be assumed to contain ACM, and be removed as such. When this is the case, no non-certified DMG personnel will be permitted entry into the compartment until all assumed and/or confirmed ACM has been removed.

Tests/Analysis to be Performed

The following laboratory tests will be performed on all samples collected where applicable:

- Polarized Light Microscopy (PLM) with Dispersion Staining
- Transmission Electron Microscopy (TEM) for Sample Confirmation

Laboratories Performing Analysis

The following analytical laboratory has been identified as one that is qualified to analyze samples for the presence of asbestos:

Schneider Laboratories, Inc.
2512 W. Cary Street
Richmond, VA 23220-5117
804-353-6778

2.9.5 Asbestos Removal/Disposal

General Conditions

All asbestos removal work will be performed by a contractor regularly engaged in such work. The contractor named below will be performing the removal work for DMG :

EC&C

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4434 Gulls Way
Virginia Beach, VA 23455
(757) 464-0044

It is the policy of DMG that its employees, and the employees of other contractors at the site (excluding the asbestos abatement contractor), will not engage in asbestos abatement work. Any DMG or other contract employee who observes materials in his work area, which he suspects may be ACM, will immediately cease work in that area and contact his supervisor for guidance.

The asbestos abatement contractor will be required to provide evidence of current licensing, as well as proof of experience for projects of similar size and scope.

The asbestos abatement contractor will be required to file the appropriate notifications with the project state office and to the EPA Region III Regional Office.

The asbestos abatement contractor will be required to submit, to DMG, copies of all valid permits, notifications, licenses, medical records, and training certificates for all personnel who enter the DMG facility to perform asbestos abatement work.

It is the policy of DMG that all work involving ACM is performed in strict accordance with all applicable laws, regulations, and standards. Any asbestos abatement contractor found to be in non-compliance with applicable laws, regulations, and standards, or DMG directives will be discharged from the remainder of his contract.

Worker Protection

The asbestos abatement contractor will provide evidence that a written respiratory protection program has been developed and implemented, is available to employees at the project site, and for inspection by DMG upon request. The program must comply with the requirements of 29 CFR 1910.134 (Respiratory Protection).

The asbestos abatement contractor will have the responsibility for enforcement of proper respirator use and shall instruct and train all personnel in the same. A copy of respirator fit-test procedures and results shall be maintained at the site for inspection by DMG personnel, along with verification that all employees have been examined by a physician within the past 12 months and found physically fit to wear respiratory protection.

Respirator selection will be made by the asbestos abatement contractor based on the requirements of 29 CFR 1915.1001 (h) Table 1.

The asbestos abatement contractor will provide all employees involved in asbestos abatement work with disposable protective clothing.

The asbestos abatement contractor shall also provide eye, head, foot, and hearing protection for all employees where such hazards exist.

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Protection of the Environment

All work involving the removal of friable and non-friable ACM will be performed in a regulated area. For the purposes of establishing DMG policy, a regulated area is defined as an airtight enclosure constructed of two layers of 6-mil polyethylene sheeting or other similar material. The regulated area shall be accessed by means of an airlock system, which will also serve as a worker decontamination facility. Ventilation to the regulated area will be provided via a HEPA filtration/exhaust system. The number of HEPA filtration/exhaust units used to ventilate the work area will be dependent on the size of the compartment where the work is being performed, but in no case shall deliver less than 4 air changes per hour.

The worker decontamination facility will consist of a serial arrangement of 3 rooms; the rooms will be designated as the clean room, shower room, and equipment room. No worker will be permitted to enter or exit the regulated area by any route, except through the decontamination unit.

Once the regulated area has been established, no asbestos abatement work will commence until the asbestos contractor's qualified person along with DMG personnel has inspected the area. Only upon acceptance of the regulated area by DMG will the authorization be given to proceed.

The asbestos abatement contractor's qualified person will be responsible for inspecting the regulated area at the beginning of each work shift, and at least once per day thereafter. Any defects or damage in the enclosure system will be repaired immediately upon discovery and any resulting debris cleaned up immediately using a HEPA filtered vacuum cleaner.

The asbestos abatement contractor will be responsible for retaining the services of a qualified Industrial Hygiene consultant to monitor all asbestos abatement activities.

Removal Procedures

All asbestos material will be removed using wet methods. Wetting will be performed using water containing a surfactant (amended water).

A fine spray of amended water will be applied prior to removal in order to reduce the fiber release potential of the material. The material should be wetted sufficiently to reduce visible emissions into the air, as well as to maintain airborne fiber levels below the PEL.

The ACM should be removed in small, manageable quantities with no excess accumulation. A "clean and bag as you go" procedure will greatly reduce the clean-up effort at the end of the work day, as well as reduce the potential for employee exposure to asbestos above the PEL.

All removed material will be placed into appropriately labeled 6-mil thick asbestos disposal bags. Care must be taken to ensure that the material is bagged while still wet.

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When full, waste bags should be goosenecked, sealed with duct tape, and labeled before removal from the regulated area.

Once all asbestos materials have been removed from a compartment, and no visible residue remains, the waste bags will be wiped down, and double bagged in a second asbestos disposal bag. The double bagged package of waste will then be removed from the regulated area and placed in an enclosed vehicle for transport to an EPA registered landfill for disposal.

Asbestos Materials Disposal

No containers of waste will be left exposed, stored, etc. in any unsecured location either inside or outside/external to the regulated work area and/or the vessel. Properly packaged and labeled asbestos waste awaiting off-site disposal will be stored in a secure, dry location which will protect the containers from damage.

The asbestos abatement contractor shall, at any time, be required to remove existing accumulated properly packaged contaminated material to the approved disposal site off the DMG work site, but in no case shall accumulated packaged asbestos waste remain on the property for longer than 7 calendar days after project completion.

The asbestos abatement contractor will remove and transport all sealed and labeled bags and drums of asbestos waste to a pre-arranged and approved disposal site off of DMG property in a manner which prevents airborne emissions of asbestos fibers, and in complete accordance with 40 CFR Part 61, Subpart M.

Within 30 days following the disposal of asbestos waste at the approved landfill facility, the asbestos contractor shall make available to DMG a copy of the disposal receipt (manifest) or record of appropriate disposal showing the name of the disposal facility and the date of disposal.

2.9.6 Intermediate Storage

All asbestos-containing waste that is to be stored before being transported from the site will be double-bagged with a caution label attached. These bags will be disposed of in an on-site enclosed dumpster which will be designated as being exclusively for asbestos-containing materials.

2.9.7 Labeling/Marking

Warning signs

Warning signs shall be provided and displayed at each regulated area. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area. The warning signs shall bear the following information:

2.9 Asbestos Abatement

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA**

DMG shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training. At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed shall be posted.

Warning labels

Warning labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers. When previously installed ACM and/or PACM is identified, labels or signs shall be affixed or posted so that employees will be notified of what materials contain ACM and/or PACM. Labels shall be attached in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical rooms/areas. Labels shall be printed in large bold letters on a contrasting background. Signs required by 29 CFR 1910.1001 (j) (3) may be posted in lieu of labels so long as they contain information required for labeling. The labels shall comply with the requirements of 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard, and shall include the following information:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

The provisions for labels do not apply where:

- Asbestos fibers have been modified by a bonding agent, coating, binder, or other material provided that the manufacturer can demonstrate that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of fibers of asbestos in excess of the action level and/or excursion limit will be released, or asbestos is present in a product in concentrations less than 1%.

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2.10 Polychlorinated Biphenyls

Process Control Procedures for Polychlorinated Biphenyls (PCBs)

Control procedures for PCB's involve considerations for both human health and the environment. For this reason, DMG's PCB control program contains elements that are essential to both worker and environmental protection.

Employee Responsibilities

- Know the potential locations of PCB-containing materials onboard the vessel.
- Do not perform any shipbreaking operations before a survey for PCB-containing items has been conducted.
- If a material that could contain PCBs is located, notify your supervisor immediately.
- Where PCB-contaminated materials are being removed, wear all appropriate personal protective equipment according to training that you have received.
- Properly label all containers used to contain PCB-contaminated wastes.
- Do not allow any PCB-containing waste or suspect PCB-containing materials to be released to the environment.
- Properly store all PCB-containing materials.
- Properly monitor and record the accumulation of PCB-containing materials.
- Immediately report the release to the environment of any PCB-containing or suspect PCB-containing materials.
- Place PCB-contaminated waste in the proper disposal containers. DO NOT mix PCB waste with any other type of waste.

Employer Responsibilities

- Train employees on the correct procedures for removing and disposing of PCBs.
- Perform a survey for PCB-containing materials before any shipbreaking work is performed. Perform this survey after surveys for asbestos has been performed.
- Ensure that employees have been supplied with the proper personal protective equipment, that they have been trained on its proper use, and that the equipment is properly used at all times.
- Maintain all required records concerning PCB-containing waste. These records should include (for each container disposed of): container contents, PCB concentrations (ppm), the container's total volume, unique identification number, date place in transport for disposal, and the date disposed of, if known. Use these records to prepare a required "Annual Records Report".
- Maintain all records for five years after operations have ceased at the DMG shipyard.
- Certify that regulated PCB-containing materials have been removed pursuant to the US EPA Interim Final Policy for Sampling Ships for PCB's Regulated for Disposal, dated November 30, 1995.

2.10 Polychlorinated Biphenyls

2.10.1 Regulatory Agencies

Environmental Protection Agency (EPA)

The U.S. Environmental Protection Agency (EPA) regulates the removal and disposal of PCBs under the Toxic Substances Control Act (TSCA) Section 6(e) and 40 CFR 761. The following activities are covered:

- Labeling
- Removal of PCB Contaminated Items
- Storage of PCB Items for Disposal
- Disposal of PCB Items
- Records and Reports

The Toxic Substance Control Act bans the manufacture, processing, use, and distribution in commerce of PCBs and directs the EPA to set regulations for the disposal of PCBs. The PCB program has historically used a limit of ≥ 50 ppm for the disposal of PCBs. PCBs ≥ 50 ppm are regulated for disposal at 40 CFR 761. The sinking of ships containing PCBs at regulated levels (≥ 50 ppm) is considered PCB disposal and requires approval under §761.62(c) from the U.S. EPA. PCBs may be found in a variety of shipboard materials but the location and concentration may vary from item to item and within classes of items. There are two ways to determine regulatory status of items suspected to contain PCBs: 1) assume “worst case” (≥ 50 ppm) and remove the suspect item(s), or 2) sample and analyze the items for PCB concentration.

DMG does not plan to store PCBs at the site for longer than 30 days. However, in the event that PCBs may be stored at the site, proper notification will be given to the EPA.

Commonwealth of Virginia

The Commonwealth of Virginia regulates the removal and disposal of PCBs under Title 9 Virginia Administrative Code (Solid Waste Management Regulations) Chapter. In addition to any federal requirements, PCB waste generators are required to assign an eight-character waste code to each container that is discarded.

2.10.2 Possible Locations of PCBs

Items aboard a vessel that could potentially contain PCBs include:

- Electrical equipment—including transformers, capacitors, fluorescent light ballasts, voltage regulators, circuit breakers, liquid filled cable, reclosers, rectifiers
- hydraulic equipment: heat transfer fluids, vacuum pump oil, air
- other felt gaskets
- grouting/caulking
- adhesives
- tapes
- rubber isolation mounts
- thermal insulation material (including fiberglass, felt, foam,

2.10 Polychlorinated Biphenyls

- | | |
|---|--|
| compressor lubricants | and cork) |
| <ul style="list-style-type: none"> • cutting oil • grease • non-conducting materials in electrical cables (such as plastics and rubber) • gaskets in air handling systems • other rubber gaskets | <ul style="list-style-type: none"> • oil-based paints • mastics • pipe hangers • foundation mounts • sound deadening felt • rubber/plastic parts of all sizes and shapes • any other materials where plasticizers were used |

These items will be evaluated in accordance with the methodology outlined in the next section to determine what amount of PCBs, if any, are contained in these items before their removal from any vessel.

2.10.3 Methods for Determining the Presence of PCBs

All vessels will be surveyed visually upon arrival to determine the location of items that could potentially contain PCBs. The EPA policy document, "Sampling Ships for PCBs Regulated for Disposal (Interim Final Policy, November 30, 1995) will be used as the basis for each PCB identification survey. Solid media that may contain PCBs include thermal insulation such as fiberglass, felt, foam, and cork; gaskets, oils, transformers, capacitors, electrical cable, circuit breakers, voltage regulators, fluorescent light ballast and applied paints. Liquid media that may contain PCB concentrations in excess of 50ppm include lubricants, hydraulic oils, and transformer and capacitor oils. The following standard procedures and norms will be used in the identification and sampling of PCBs in a vessel:

1. All electrical cable (Stratum I) will be presumed to contain greater than 50 ppm of PCBs and as such will be removed and disposed of as described later in this section.
2. All ventilation gaskets (Stratum II) will be presumed to contain greater than 50 ppm of PCBs and as such will be removed and disposed of as described later in this section.
3. All water line and fuel line gaskets (Stratum III) will be presumed to contain greater than 50 ppm of PCBs and as such will be removed and disposed of as described later in this section.
4. All other Stratum III media such as fiberglass insulation, cork insulation, caulking, grout, and fluorescent light ballast casings will also be presumed to contain greater than 50 ppm and will be removed and disposed of as described later in this section.
5. All transformers, capacitors, circuit breakers and voltage regulators will be presumed to contain greater than 50 ppm of PCBs and as such will be removed as described later in this section.

2.10 Polychlorinated Biphenyls

6. Any and all tanks containing heat transfer fluids, oils, lubricants, and/or greases will be sampled independently.
7. One sample from each independent media within separate rooms/compartments will be taken.
8. The results for a sample taken from a specific media will be assumed to be representative of the totality of the media within that room/compartment.

The rational behind the first three norms listed above is the high probability that these materials contain significant PCB concentrations. Assuming all items listed above contain greater than 50 ppm of PCBs will significantly reduce the sampling costs associated with the process and will also minimize the inherent omission risk of random sampling.

All samples will be identified, labeled and traced by the deck and compartment from which they were extracted. Furthermore, they will be plotted in a diagram of the vessel for ease of reference.

Qualified field personnel from DMG will perform all sampling. A chain of custody form will be maintained for all samples collected.

Testing and Analysis to be Performed

The following laboratory analysis will be performed for all samples collected:

EPA methods 8080, 8081, or 8082, as required. The Soxhlet extraction procedure will be used on all samples.

Laboratories Performing Analysis

The following analytical labs have been identified as one that is qualified to analyze samples for the presence of PCBs:

Clayton Group Services 22345 Roethel Drive Novi, MI 48375 248-344-1770	Severn Trent Environmental Laboratories (STL) 450 William Pitt Way Pittsburgh, PA 15238 610-380-1174
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Clayton and STL maintains numerous accreditations and laboratory certifications.

2.10 Polychlorinated Biphenyls

2.10.4 PCB Removal, Storage, and Disposal

Removal

All gaskets, electrical cable, transformers, capacitors, circuit breakers, and all other potential media that test positive for PCB contamination greater than 50 ppm will be removed by trained personnel. Training requirements are outlined below.

DMG will remove PCB items from the vessel according to the cutting and dismantling schedule developed for that particular vessel. All Stratum I, II, and III PCB Bulk Product Waste, as described in 40CFR section 761.62, will be removed using non-flammable means such as manual and hydraulics shears and clippers. Workers will utilize appropriate PPE during the removal process, including but not limited to goggles, halfmask respirators with HEPA filtration cartridges, hardhats, rawhide gloves, and cotton uniforms that will be laundered daily by DMG.

These items will be placed in a structurally sound metal bin, which will be labeled as containing PCBs. Fiberglass insulation will be placed into high-density, 6-mil polyethylene disposal bags prior to being deposited in the bin. A label will be placed on the bin, indicating the date on which the first items were placed into that respective bin.

Any items placed inside the bin henceforth will be considered to have been generated on the original date placed on the bin until the bin is full and ready for disposal. A dated log will be kept of the descriptions and approximate quantities of PCB Bulk Product Waste placed in the bin in order to identify the make-up and dates of removal of all items inside the bin.

DMG intends not to maintain any PCB Bulk Product Waste on its premises for more than 30 days. The bin in which this waste will be stored during such time period will be covered to prevent rainfall contamination and/or exposure to the weather.

Any items or areas of the vessel(s) containing materials contaminated with liquid PCB's will be identified and removed from the vessel first. These items require more careful handling than solid PCBs since they have the potential to spill and may leach contaminants into the soil or water. The items containing liquid PCBs will be either unbolted or cut from their position on the vessel utilizing power saws or other non-burning tools. They will then be placed in drums in order to contain any possible spills. The drums will be placed in a bin, which will then be transferred from the vessel to the ground by a crane.

In the event that the integrity of an item's casing is suspect, the item will be removed by HAZMAT-trained personnel wearing the appropriate viton elastomer gear including disposable suits, gloves and boots. Goggles or other appropriate eye protection will also be used during handling. Prior to being removed, the questionable item will be placed in a barrel or containment bin to prevent spillage. These materials will be disposed of immediately.

All items that present no evident risk of spillage will be removed by personnel trained in PCB Awareness and in the procedures described in this section. Employees will be instructed to wear viton elastomer gloves, boots, and coveralls to prevent potential skin contact with PCB's.

2.10 Polychlorinated Biphenyls

Storage

All PCB Bulk Product Waste will be removed and stored in a covered metal bin on the barge (IX-509) for no more than thirty days prior to disposal. Generally, PCB storage requirements apply to PCBs and PCB items that have been removed from service and are designated for disposal. Complying with the storage requirements set forth in 40 CFR 761 for PCBs involves:

- establishing a proper storage facility for PCBs;
- utilizing proper containers for PCB storage;
- managing PCB storage in accordance with marking, record keeping, and inspection requirements;
- understanding what PCBs and PCB items require storage and the various storage options that are available; and
- removal from storage and disposal of PCBs and PCB items within the appropriate time limitation as described in the Virginia and EPA Waste Management Regulations. DMG is considered a Small Quantity Generator (SQG) under EPA and Virginia Waste Management regulations. DMG generally may accumulate hazardous waste on-site for 180 days or less without a permit prior to removal for transport the PCBs for final disposition (40 CFR 262.34(d)).

The temporary accumulation area will be on the barge and will be marked in accordance this program. In the event that material must be stored off of the ship, DMG will prepare a hazardous materials storage building. The hazardous materials storage building will be constructed in accordance with the requirements of 40 CFR 761.60. These requirements are as follows:

- The facility has an adequate roof and walls to prevent rainwater from reaching the stored PCBs and PCB Items (761.65(b)(1)(1c))
- The facility has an adequate floor that has continuous curbing with a minimum 6-inch high curb. (761.65(b)(1)(ii))
- The facility was constructed without drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from the curbed area. (761.65(b)(1)(iii))
- The floors and curbing have been constructed of continuous smooth and impervious materials (concrete) to prevent or minimize penetration of PCBs. (761.65(b)(1)(iv))
- The storage area is not located below the 100-year flood water elevation.

In the unlikely event that there is a need to store such materials for longer than 30 days, the bin will be transferred to a covered storage area with secondary containment. Although the storage of Bulk Product Waste or PCB waste is not anticipated, the following PCB items may be stored temporarily in an area that does not comply with the above requirements for up to 30 days

2.10 Polychlorinated Biphenyls

("thirty-day temporary storage") from the date of their removal from service, provided that a notation is attached to the PCB item or a PCB container indicating the date the item was removed from service:

- Non-leaking PCB articles and PCB equipment;
- Leaking PCB articles and PCB equipment if the PCB items are placed in a non-leaking PCB container that contains sufficient sorbent material to absorb any liquid PCB's remaining in the PCB item; and
- PCB containers containing non-liquid PCB's such as contaminated soil, rags, and debris.

Another storage option outlined in the PCB regulations is often referred to as "pallet storage". Pallet storage allows certain PCB Items to be stored temporarily on pallets next to a PCB storage facility that meets the above requirements provided that a notation is attached to the PCB Item or PCB container indicating the date the item was removed from service for disposal. These PCB items will be checked weekly when stored outside the facility. Any leaking PCB Items will be placed inside the storage area. We do not anticipate the use of pallet storage as a storage option.

Containers used for the storage of PCBs (known or presumed 50 ppm or greater) will comply with the shipping container specifications of the Department of Transportation (DOT) 49 CFR 178. Containers approved for the storage of non-liquid PCBs include:

- DOT-5 steel drum without removable head
- DOT-5B steel drum without removable head
- DOT-17C single trip steel drum with removable head

As an alternate, containers larger than those specified in DOT specifications 5, 5B, or 17C may be used for non-liquid PCBs if the containers are designed and constructed in a manner that will provide as much protection against leaking and exposure to the environment as the specifications of other approved DOT containers (761.65(c)(6)).

PCB articles and PCB containers will be dated on the article or container when they are placed in storage. The storage will be managed so that the PCB articles and PCB containers can be located by the date that they entered storage.

All PCB storage areas including the DOT approved containers, "PCB storage facility" as well as "30-day temporary storage" and "pallet storage" areas will be marked/labeled in accordance with the EPA marking requirement at 40 CFR 761.40(a)(10).

DMG will establish and maintain records on the storage and disposition of PCBs other than PCB Bulk Product Waste. PCB Bulk Product Waste will be disposed of in a solid waste landfill in accordance with 40 CFR Part 761.62(b), and as such are exempt from the requirements of subchapters C, J, and K of 40 CFR Part 761 (marking, general record keeping, and waste disposal records).

2.10 Polychlorinated Biphenyls

For PCB containers used for non PCB Bulk Product Waste, these records will include: container contents, PCB concentrations (ppm), the container's total volume, unique identification number, date place in transport for disposal, and the date disposed of, if known. These records will form the basis of the "Annual Records Report" to be prepared by DMG.

The records and documents will be maintained for at least 5 years after the facility ceases storing PCBs and PCB items. An annual document will be prepared by July 1 of each year. The "PCB Annual Document and Worksheet" will be completed by July 1 of each year and maintained at the facility and made available for inspection by representatives of the EPA during normal working hours. The operator of the facility will know the location of the records. Also kept with the annual document will be a signed manifest from the disposer for any PCB contaminated items sent for disposal.

All PCB articles and PCB containers in the PCB storage facility will be inspected for leaks at least once every 30 days. Any leaking PCB articles and PCB containers and their contents will be transferred immediately to properly marked non-leaking containers. Any PCB capacitors and PCB-contaminated electrical equipment stored adjacent to the PCB storage facility on pallets will be inspected for leaks weekly. (761.65(c)(2))

Any non-liquid PCB article or PCB container stored for disposal will be removed from storage and disposed as required within 30 days from the date when it was first placed in storage. Accumulations of liquid PCB's will be disposed of at the time they are generated, contained, and labeled.

Disposal

PCBs and PCB-containing items, after being characterized as to PCB concentration, will be contained and marked for storage and/or manifested for transportation to an approved disposal facility for disposal in accordance with 40 CFR 262 and 761.60. Any liquid PCB's will be extracted and disposed of by an accredited contractor in a TSCA regulated and approved facility. Manifests will be maintained at DMG for the duration of the company's life. Items, articles, or other PCB wastes requiring hazardous disposal will be transported from the site by:

Asbestos Waste Services; Inc.
412 Oakmeads Crescent (Suite 203)
Virginia Beach, VA 23462-4200
(757) 497-6194

Asbestos Waste Services will also arrange for disposal by delivering same in approved containers to a properly certified and pre-approved disposal company. Disposal arrangements will be determined based on the nature of the material, the PCB content, and the PCB containing material quantity.

2.10 Polychlorinated Biphenyls

Paints and other thin coatings on metal will not be required to be removed if the coated metal will be smelted domestically in a smelter meeting the definition of an industrial furnace at 40 CFR 761.72(a). For smelting outside of the United States, export of the vessel having these metal coatings will be pursuant to an EPA enforcement agreement.

DMG will maintain manifests and receipts for each shipment involving the disposal of PCB contaminated or containing items. The information kept for each shipment will include at least the following:

1. Date of shipment;
2. Approved licensed hauler name, business address, phone number, and driver name;
3. Quantity and description of materials to be disposed;
4. Location of EPA approved disposal site including address, phone number and point of contact; and
5. Manifest and receipt of disposal.

2.10.5 Labeling/Marking

All containers whose contents are contaminated with PCBs or self-contained items with PCBs shall be labeled with a PCB mark. This mark shall be at least 15.25 cm (6 in.) on each side with letters and border striping on a white or yellow background. Any container or item that is too small for this mark will be labeled with a label whose size is proportionately reduced.

2.10.6 Training of Personnel

All DMG personnel will receive a basic PCB Awareness training course. The purpose of this course will be to ensure that all employees understand the nature of this contaminant and the potential hazards associated with it. The training will include instruction on how to properly handle and remove items that contain PCB contaminants without being directly exposed to the contaminant. An accredited training provider will conduct the training. The training, which will consist of an interactive lecture, will include the following topics:

- What are PCBs and what are they used for.
- Where can PCBs be found.
- What to do in case one finds exposed and/or spilled PCBs.
- How to work with PCB contaminated items without exposing oneself directly to the substance.
- What kind of Personal Protective Equipment (PPE) must be worn to avoid PCB exposure.
- What are the potential health hazards posed by PCBs.

This training will be conducted at least annually, and all training certificates will be kept on file at DMG. There will also be a pre-operations meeting with all employees when a vessel arrives

2.10 Polychlorinated Biphenyls

at the DMG facility. One of the topics to be discussed will be the potential location of PCBs aboard the vessel and the schedule for sampling and removal.

2.11 Chromated Water

Process Control Procedures for Chromated Water

Employees

- Know the potential locations of chromated water onboard the vessel.
- Know the proper procedures for removing chromated water from the vessel before performing such operations.
- Prevent the release of chromated water to the environment whenever possible.
- Report any spills to your supervisor immediately.
- Place chromated water in the proper disposal containers. DO NOT mix chromated water with any other type of waste.

Employer

- Perform a survey to identify any chromated water located on board the vessel.
- Provide proper training in removing and disposing of chromated water to employees required to perform such work.
- Identify the proper authorities to contact in the event of a release of chromated water to the environment.

2.11.1 Regulatory Agencies

EPA

The EPA regulates the removal and disposal of chromated water under Title 313 of 40 CFR.

VA DEQ

The VA DEQ regulates the removal and disposal of chromated water under Title 62.1. - Waters of the State, Ports and Harbors, and Chapter 11.1 - Department Of Environmental Quality.

2.11.2 Possible Locations of Chromated Water

The principle location of chromated water on a vessel would be in the ballast tanks. Water from the tanks will be tested in accordance with the sampling methodology outlined in the next section to determine what amount of chromium, if any is contained in these items before their removal.

2.11.3 Methods for Determining the Presence of Chromium

Sample Methodology

Samples will be taken from all ballast tanks to determine if the contents have been contaminated with chromium.

2.11 Chromated Water

Tests/Analysis to be Performed

The following laboratory tests will be done on all samples collected:

EPA Method 200.8/6020, using ICP/MS analysis.

The following analytical labs have been identified as one which is qualified to analyze samples for the presence of chromium:

Clayton Group Services 22345 Roethel Drive Novi, MI 48375 248-344-1770	Severn Trent Environmental Laboratories (STL) 450 William Pitt Way Pittsburgh, PA 15238 610-380-1174
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Clayton and STL maintain numerous accreditations and laboratory certifications.

2.11.4 Chromate Removal/Disposal

Removal

Water determined to contain chromium will be removed in a way that will minimize the risk of accidental release to both the surrounding land and waterway.

Disposal

Water containing chromium will be transported to a facility licensed to receive such wastes, with appropriate records of the transfer being retained by DMG.

2.11.5 Labeling/Marking

All containers whose contents are contaminated with chromium or self-contained items with chromium will be labeled as containing chromium.

2.12 Mercury

Process Controls for the Disposal of Mercury

Employees

- Know the potential locations of mercury onboard the vessel.
- Know the proper procedures for removing mercury from the vessel before performing such operations.
- Place mercury in the proper disposal containers. DO NOT mix mercury with any other type of waste.
- Use proper personal protective equipment when removing mercury from the vessel.

Employer

- Train employees on the proper procedure for removing mercury from the vessel.
- Do not permit employees who have not been trained in the proper removal, storage, and disposal procedures to remove mercury from vessels.
- Provide employees with the proper personal protective equipment. Ensure that these employees have been properly trained in the equipment's use and that they wear the equipment properly at all times.
- Ensure that mercury waste is disposed of separately from all other wastes.

2.12.1 Regulatory Agencies

EPA

The EPA regulates the removal and disposal of mercury under 40 CFR 260-279, Resource Conservation and Recovery Act. The universal waste citations listed can be found at 40 CFR 273.

VA DEQ

The VA DEQ regulates the removal and disposal of mercury under Title 62.1. - Waters of the State, Ports and Harbors, and Chapter 11.1.

2.12.2 Possible Locations of Mercury

Items aboard a vessel that could potentially contain mercury include:

- Gauges,
- Control panels,
- Lamps, and
- Thermostats.

As indicated above, certain regulations apply to mercury contained devices such as thermostats (40 CFR 273.4). For example, Thermostats are not considered waste under part 40 CFR 261

2.12 Mercury

until it is discarded. Thermostats are generally not considered a hazardous waste. A thermostat is a hazardous waste if it exhibits one or more of the characteristics identified in 40 CFR part 261, subpart C. DMG will comply with all requirements of the EPA's universal waste management regulations as it pertains to treatment and disposal of mercury containing materials.

As needed, these items will be tested in accordance with the sampling methodology outlined in the next section to determine what amount of mercury, if any is contained in these items before their removal and disposal.

2.12.3 Methods for Determining the Presence of Mercury

Sample Methodology

Items known to contain mercury will not generally be sampled. Sampling for mercury will be done as needed on items suspected of containing mercury.

Tests/Analysis to be Performed

The following laboratory tests will be done on all samples collected:

EPA Method 200.8/6020, using ICP/MS analysis.

The following analytical laboratories has been identified as one that is qualified to analyze samples for the presence of mercury:

Clayton Group Services 22345 Roethel Drive Novi, MI 48375 248-344-1770	Severn Trent Environmental Laboratories (STL) 450 William Pitt Way Pittsburgh, PA 15238 610-380-1174
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Clayton and STL maintain numerous accreditations and laboratory certifications.

2.12.4 Mercury Removal/Disposal

Removal

Items that have been determined to contain mercury will be removed in a manner designed to minimize the risk and impact of an accidental release. Mercury will be placed in sealed and labeled containers for disposal. Following the universal waste requirements, these containers will be stored, if necessary, in an area that is designated for the storage of hazardous materials. This area will be located in an area where the potential for accidental release is minimized. Any person handling mercury will ensure they use the appropriate impermeable gloves to prevent skin contact. Mercury will not be heated or otherwise aerosolized to present an inhalation hazard.

2.12 Mercury

Disposal

All mercury-containing items to be disposed of will be transported and disposed in facilities that are approved by regulatory agencies to handle waste contaminated by mercury.

Labeling/Marking

All containers whose contents are contaminated with mercury or self-contained items with mercury will be labeled.

2.13 Ozone Depleting Substances

Process Control Procedures for Ozone Depleting Substances

Employees

- Know the potential locations of ozone depleting substances onboard the vessel.
- Know the proper procedures for removing ozone-depleting substances from the vessel before performing such operations.
- Report any spills to your supervisor immediately.
- Place ozone-depleting substances in the proper disposal containers. DO NOT mix ozone-depleting substances with any other type of waste.

Employer

- Train employees on the proper procedures for removing, storing, and disposing of ozone depleting substances.
- Ensure that ozone-depleting substances are disposed of properly, and that ozone-depleting substances are not mixed with any other type of waste.
- Ensure that employees know how to identify ozone-depleting substances.

2.13.1 Regulatory Agencies

EPA

The EPA regulates the removal and disposal of ozone depleting substances under 40 CFR 82.150(b) and 82.152.

VA DEQ

Virginia has promulgated by reference the Clean Air Act, which includes 40 CFR 82.

2.13.2 Possible Locations of Ozone Depleting Substances

Ozone depleting substances include materials such as freon and halon. Items aboard a vessel that could potentially contain ozone-depleting substances include:

- compressors,
- air conditioning units,
- refrigeration devices, and
- fire suppression units.

These items will be tested in accordance with the sampling methodology outlined in the next section to determine what amount of ozone depleting substances, if any, is contained in these items before their removal.

2.13 Ozone Depleting Substances

2.13.3 Methods for Determining the Presence of Ozone Depleting Substances

Sample Methodology

All items listed above will be tested for the presence of Class I or Class II ozone depleting substances as defined in 40 CFR 82.

Tests/Analysis to be Performed

Laboratory tests will be done on all samples collected to identify whether or not the sample is an ozone depleting substance, and to classify the type of ozone depleting substance.

Laboratories Performing Analysis

The following analytical lab has been identified as one that is qualified to analyze samples for the presence of ozone depleting substances:

Clayton Group Services
22345 Rothel Drive
Novi, MI 48375
248-344-1770

2.13.4 Ozone Depleting Substances Removal/Disposal

Classifications

Class I Controlled Substances:

A. Group I:

CFCl₃-Trichlorofluoromethane (CFC-11)
CF₂Cl₂-Dichlorodifluoromethane (CFC-12)
C₂F₃Cl₃-Trichlorotrifluoroethane (CFC-113)
C₂F₄Cl₂-Dichlorotetrafluoroethane (CFC-114)
C₂F₅Cl-Monochloropentafluoroethane (CFC-115)
All isomers of the above chemicals

B. Group II:

CF₂ClBr-Bromochlorodifluoromethane (Halon-1211)
CF₃Br-Bromotrifluoromethane (Halon-1301)
C₂F₄Br₂-Dibromotetrafluoroethane (Halon-2402)
All isomers of the above chemicals

C Group III:

CF₃Cl-Chlorotrifluoromethane (CFC-13)
C₂FCl₅- (CFC-111)
C₂F₂Cl₄- (CFC-112)
C₃FCl₇- (CFC-211)
C₃F₂Cl₆- (CFC-212)
C₃F₃Cl₅- (CFC-213)

C₃F₄Cl₄- (CFC-214)

C₃F₅Cl₃- (CFC-215)

C₃F₆Cl₂- (CFC-216)

C₃F₇Cl- (CFC-217)

All isomers of the above chemicals

D Group IV: CCl₄-Carbon Tetrachloride

E Group V:

C₂H₃Cl₃-1, 1,1 Trichloroethane (Methyl chloroform)
All isomers of the above chemical except 1,1,2-trichloroethane

F Group VI: CH₃Br--Bromomethane (Methyl Bromide)

G Group VII:

CH₂Br₂
CHF₂Br (HBFC-2201)
CH₂FBr
C₂HFB₄

2.13 Ozone Depleting Substances

C₂HF₂Br₃
C₂HF₃Br₂
C₂HF₄Br
C₂H₂FBr₃
C₂H₂F₂Br₂
C₂H₂F₃Br
C₂H₂FBr₂
C₂H₃F₂Br
C₂H₄FBr
C₃HFB₆
C₃HF₂Br₅
C₃HF₃Br₄
C₃HF₄Br₃
C₃HF₅Br₂
C₃HF₆Br

C₃H₂FBr₅
C₃H₂F₂Br₄
C₃H₂F₃Br₃
C₃H₂F₄Br₂
C₃H₂F₅Br
C₃H₃FBr₄
C₃H₃F₂Br₃
C₃H₃F₃Br₂
C₃H₃F₄Br
C₃H₄FBr₃
C₃H₄F₂Br₂
C₃H₄F₃Br
C₃H₅FBr₂
C₃H₅F₂Br
C₃H₆FBr

Class II Controlled Substances

CHFC₂-Dichlorofluoromethane (HCFC-21)
CHF₂Cl-Chlorodifluoromethane (HCFC-22)
CH₂FCl-Chlorofluoromethane (HCFC-31)
C₂HFCl₄- (HCFC-121)
C₂HF₂Cl₃- (HCFC-122)
C₂HF₃Cl₂- (HCFC-123)
C₂HF₄Cl- (HCFC-124)
C₂H₂FCl₃- (HCFC-131)
C₂H₂F₂Cl₂- (HCFC-132b)
C₂H₂F₃Cl- (HCFC-133a)
C₂H₃FCl₂- (HCFC-141b)
C₂H₃F₂Cl- (HCFC-142b)
C₃HCFC₆- (HCFC-221)
C₃HF₂Cl₅- (HCFC-222)
C₃HF₃Cl₄- (HCFC-223)
C₃HF₄Cl₃- (HCFC-224)
C₃HF₅Cl₂- (HCFC-225ca)
C₃HF₆Cl- (HCFC-225cb)

C₃HF₆Cl- (HCFC-226)
C₃H₂FCl₅- (HCFC-231)
C₃H₂F₂Cl₄- (HCFC-232)
C₃H₂F₃Cl₃- (HCFC-233)
C₃H₂F₄Cl₂- (HCFC-234)
C₃H₂F₅Cl- (HCFC-235)
C₃H₃FCl₄- (HCFC-241)
C₃H₃F₂Cl₃- (HCFC-242)
C₃H₃F₃Cl₂- (HCFC-243)
C₃H₃F₄Cl- (HCFC-244)
C₃H₄FCl₃- (HCFC-251)
C₃H₄F₂Cl₂- (HCFC-252)
C₃H₄F₃Cl- (HCFC-253)
C₃H₅FCl₂- (HCFC-261)
C₃H₅F₂Cl- (HCFC-262)
C₃H₆FCl- (HCFC-271)
All isomers of the above chemicals

Removal Methods

Units containing ozone-depleting substances will be emptied by a licensed and certified disposal company. Records of the types and amounts of ozone depleting substances will be maintained by DMG at the site for at least three years.

Disposal

DMG prohibits the knowing venting or otherwise releasing into the environment any class I or class II substance used as a refrigerant. DMG will not dispose of any device containing a class I or class I substance unless the refrigerant in the entire unit has been evacuated to a certified recovery or recycling machine.

2.13 Ozone Depleting Substances

2.13.5 Labeling/Marking

All containers whose contents are contaminated with ozone depleting substances or self-contained items with ozone depleting substances will be labeled.

2.14 Wastewater

Process Control Procedure for the Disposal of Non-Point Source Wastewater

2.14.1 Permit Application

The facility will apply for an NPDES permit that addresses all point source wastewater discharges which was submitted by the actual operator of the facility. This application will be submitted at least 30 days prior to the commencement of operations.

The application includes the following information:

- A description of waste water producing activities;
- Name, mailing address, and location of the facility for which the application is submitted;
- Up to four SIC codes which best reflect the facility's products/services;
- Operator's name, address, telephone number, ownership status, and status as Federal, State, private, public or other entity;
- Whether the facility is located on Indian lands;
- Complete facility permit listing, including any construction approvals received or applied for under the Hazardous Waste Management program under RCRA; the UIC program under SDWA, the NPDES program under CWA, the PSD program of the CAA; the Nonattainment program under the CAA; the NESHAPS preconstruction approval under the CAA; ocean dumping permits under the Marine Protection Research and Sanctuaries Act; dredge or fill permits under section 404 of the CWA; and, other relevant environmental permits, including State permits.
- A topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures; each of its hazardous waste treatment, storage, or disposal facilities; each well where fluids from the facility are injected underground; and those wells, springs, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant in the map area; and
- A brief description of the nature of the business.
- Longitude and latitude of outfall(s) to the nearest 15 seconds and the name of the receiving water;
- The date of expected commencement of discharge (for new dischargers);
- An identification of the general type of waste discharged, or expected to be discharged upon commencement of operations, including sanitary wastes, restaurant or cafeteria wastes, or noncontact cooling water;
- An identification of cooling water additives (if any) that are used or expected to be used upon commencement of operations, along with their composition if existing composition is available;
- Effluent characterization (BOD, TSS, Fecal Coliform (if believed present or if sanitary waste is or will be discharged), Total Residual Chlorine (if chlorine is used), Oil and

2.14 Wastewater

Grease, COD (if non-contact cooling water is or will be discharged), TOC (if non-contact cooling water is or will be discharged), NH₃ as N, Discharge Flow, pH, and Temperature (Winter and Summer));

- A description of the frequency of flow and duration of any seasonal or intermittent discharge (except for stormwater runoff, leaks, or spills);
- A brief description of any system used or to be used;
- Any additional information the applicant wishes to be considered, such as influent data for the purpose of obtaining "net" credits pursuant to 122.45(g); and
- A signature of certifying official under 122.22.

Estimates for the pollutants or parameters listed instead of actual sampling data will be included, along with the source of each estimate. All levels must be reported or estimated as concentration and as total mass, except for flow, pH, and temperature. In addition, the new discharger must complete and submit Item IV of Form 2e (see 122.21(h) (4)) by providing quantitative data in accordance with that section no later than two years after commencement of discharge. However, the applicant need not complete those portions of Item IV requiring tests that he has already performed and reported under the discharge monitoring requirements of his NPDES permit.

For a facility which is a "new source" and which is located in a State without an approved NPDES program, did the facility submit the application for an NPDES permit prior to beginning any on-site construction as defined in 122.29. [122.21(l)]

2.14.2 Permit Conditions

The facility will comply with all effluent standards, prohibitions and conditions of the approved permit. DMG will take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of the permit that has a reasonable likelihood of adversely affecting human health or the environment. The facility will properly operate and maintain at all times, all facilities and systems of treatment and control that are installed or used by the facility to achieve compliance with the permit.

The facility will provide requested information and access to facility for inspections, including sample collection, by authorized representatives of the permitting agency. All samples and measurements taken for the purposes of monitoring information are representative of the permitted discharge.

2.14.3 Recordkeeping

All calibrations, maintenance records and all original strip chart recordings from continuous monitoring instrumentation will be retained on-site for at least three years. Copies of all reports required by the permit will be retained on-site for at least three years. All records of data used to complete the permit application will be retained on-site for at least three years.

Monitoring records will include the following:

- date,

2.14 Wastewater

- exact place and time of sampling or measurement.
- individual(s) who performed the sampling or measurements,
- date(s) analyses were performed,
- analytical techniques or methods used, and
- analytical results,

All monitoring will be conducted according to test procedures approved under 40 CFR 136. All monitoring reports and other information submitted to the permitting agency will be signed and certified. All data used to complete permit applications and any supplemental information submitted in conjunction with a permit application will be retained for at least three years from the date the application is signed.

2.15 Handling Fuels, Oils & Lubricants

Process Control Procedure for Handling Fuels, Oils, and Lubes

Employees

- Know the potential locations of fuels, oils, and lubes onboard the vessel.
- Know the proper procedures for pumping fuels, oils, and lubes off of the vessel before performing such operations.
- Do not cause the release of any amount of fuels, oils, or lubricants onto the property or into the water.
- Report any spills to your supervisor immediately, including the location and types of spills.
- Place waste oils, fuels, and lubes in the proper disposal containers. DO NOT mix waste oils, fuels, or lubes with any other type of waste.
- Make all necessary preparations to control the accidental release of fuels, oils and lubes.

Employers

- It will be the intent of DMG to subcontract all handling of fuels, oils, and lubricants to an EPA and USCG licensed and approved transportation company.
- Make all possible arrangements to contain potential spills before removal operations begin.
- Immediately inform local authorities in the event of a spill.
- Immediately inform the USCG in the event of a spill to navigable waters.
- Ensure that waste oils are properly disposed of in containers designated for that type of waste. Do not allow oils to be mixed with other types of waste.

15.1 Regulatory Agencies

EPA

The EPA regulates the removal and disposal of waste oils under 40 CFR. Spill Prevention and Management falls under several regulations, including:

- Clean Water Act (CWA): 33 USC 1251 to 1376 (See 33 USC 1321, oil and hazardous substances)
- Oil Pollution Act of 1990 (OPA): 33 USC 2701 to 2761
- Discharge of oil regulations: 40 CFR 110
- Oil pollution prevention regulations: 40 CFR 112
- National Contingency Plan: 40 CFR 300
- United States Coast Guard (USCG) oil pollution regulations: 33 CFR 136 (oil spill liability trust fund), 33 CFR 151 to 156, 61 Federal Register (FR) 41452 to 41462 (8/8/96) (facilities transferring oil or hazardous materials in bulk)
- "One plan" contingency plan guidance: 61 FR 28642 (6/5/96)

2.15 Handling Fuels, Oils & Lubricants

40 CFR Part 112 provides for the preparation and implementation of Spill Prevention Control and Countermeasure Plans (SPCC) to minimize the potential for oil discharges at facilities where bulk fuels are stored. [112.1(e)]. Facilities that store greater than 1,320 gallons of product are required to prepare and maintain a SPCC Plan.

Section 311 of the Clean Water Act (which amended the original Federal Water Pollution Control Act) makes illegal the discharge of oil or hazardous substances into the waters of the United States within 12 miles of the coast or where it may affect natural resources such as marine sanctuaries.

The law requires the person in charge of a vessel (or a facility) who witnesses or sees a spill that discolors the surface of the water – creates a "sheen" – to report the spill to the U.S. Coast Guard or the National Response Center at 1-800-424-8802 immediately. In the event of a spill to navigable waters, the USCG will be contacted via the National Response Center at 800-424-8802. Federal law requires the U.S. Coast Guard responds to, assess, and investigate all spills and potential spills.

VA DEQ

The VA DEQ regulates the removal and disposal of waste oils under Title 62.1. - Waters of the State, Ports and Harbors, and Chapter 11.1 - Department Of Environmental Quality. The VA DEQ manages above ground storage of bulk fuels. Under 9 VAC 25-91, as promulgated by various USCG and EPA regulations, the VA DEQ requires bulk fuel storage facilities near navigable waters with greater than 25,000 gallons of storage capacity to prepare and implement maintain Oil Discharge Contingency (ODC) Plans.

Any petroleum release greater than 25 gallons must be reported to the VA DEQ within 24 hours. Contact information includes:

VA DEQ – Tidewater Regional Office
5636 Southern Blvd.
Virginia Beach, VA 23462
Phone: (757) 518-2000
FAX: (757) 518-2009

Remediation Program Manager: Dave Borton

15.2 Possible Locations of Fuels, Oils, and Lubes

Items aboard a vessel which could potentially contain waste oils include but are not limited to:

- tanks
- pipes
- engines.

2.15 Handling Fuels, Oils & Lubricants

These items will be tested prior to removal in accordance with the sampling methodology outlined in the next section to determine the identity of the petroleum products and the potential content of hazardous substances such as PCBs, if any.

15.3 Methods for Determining the Presence of Fuels, Oils, and Lubes

Sample Methodology

Sampling for petroleum products will be done in the following manner:

Oils will be tested to determine PCB content. If the content exceeds 50 parts per million (ppm), then those oils will be handled in accordance with the PCB guidelines found in section A1. All other petroleum products will be sampled to determine their exact classification in order to determine the proper method of disposal.

Tests/Analysis to be Performed

Laboratory tests will be done on all samples collected to determine their exact nature.

Laboratories Performing Analysis

The following analytical labs have been identified as one that is qualified to analyze samples for the presence of and identities of petroleum products:

Clayton Group Services 22345 Rothel Drive Novi, MI 48375 248-344-1770	STL 450 William Pitt Way Pittsburgh, PA 15238 610-380-1174	Universal Labs 20 Research Drive Hampton, VA 23666 757-865—0880
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15.4 Fuel, Oil, and Lube Removal/Disposal

Removal

The products mentioned above will be removed from the vessel in a manner specifically designed to minimize the risk of accidental release of the materials into the water and onto land. Protocols designed in conjunction with the Bay Bridge Enterprise's SPCC plan will be used.

Disposal

All waste petroleum products will be disposed of by delivering same in approved containers or by direct vacuum truck removal to a properly certified and pre-approved disposal company. For this project C&M Industries, Inc., Chesapeake, Virginia will handle the transportation and disposal of fuels, oils and lubricants.

2.15 Handling Fuels, Oils & Lubricants

Labeling/Marking

All containers that are used to transport waste petroleum products will be labeled to clearly show what the contents of each is.

15.6 Spill Prevention and Emergency Response Procedures

General

The DMG Shipyard does not store bulk fuels, oils or lubricants at its facility. Hence, due to their lack of bulk fuel storage capacity, neither the DMG shipyard facility is not required by EPA, USCG or VA DEQ regulations to have formal SPCC or ODC Plans. However, as part of their VPDES Permits and within the SWPP Plans, a spill response plan is in place at both the DMG and the SIMS Metals facilities.

Spill emergency response procedures have been developed by DMG and are presented in the Contingency Plans Section of the HASP (also part of this TCP). These procedures are summarized below.

Responsibilities

Personnel have been instructed in the operation and maintenance of equipment to prevent the discharges of oil and applicable pollution control laws, rules and regulations. The following persons have been designated as being accountable for oil spill prevention, management and reporting:

Mr. Tim Mullane, DMG Shipyard Manager

Mr. Marc McPherson, SIMS Metals Shipyard Operations Manager

Spill prevention briefings are scheduled and conducted for facility operating personnel at one month intervals to assure adequate understanding of the Spill Response Plan for the facility. These briefings include topics such as known spill events or failures, malfunctioning components, and recently developed precautionary measures.

Training

Facility personnel have been properly instructed in the procedures to respond to discharges of oil and in applicable oil spill response laws, rules, and regulations. The training is functional in nature according to job tasks for both supervisory and non-supervisory operational personnel and includes specific lesson plans on subject areas relevant to facility personnel involved in oil spill response and cleanup.

2.15 Handling Fuels, Oils & Lubricants

15.7 Summary of Spill Response Procedures

NOTE: IN CASE OF FIRE, PROTECT HUMAN LIFE AND SAFETY, AND TAKE APPROPRIATE STEPS TO PUT OUT THE FIRE FIRST. THE CONTROL OF SPILLS IS SECONDARY TO SUCH CONCERNS.

In Advance

Familiarize yourself with locations, contents, and appropriate use of spill kits (e.g. pads, booms), absorbent materials, waste drums, shovels and brooms, appropriate personal protective equipment (e.g. rubber gloves, safety goggles); and Material Safety Data Sheets (MSDS).

At Time Of Spill

When an oil spill is discovered, the employee discovering the spill must immediately stop the source of the oil and commence containment of the spill in as small an area as possible. The employee will promptly report spill to his Supervisor who will contact the Shipyard Manager to determine reporting requirements. The Supervisor and/or Shipyard Manager will dispatch additional personnel and equipment as required to assist in containment of the spill. The Shipyard Manager will provide any required notifications to government agencies and recommend options for cleanup, storage, and disposal of spill residue. The Shipyard Manager will log the event on the "Spill Log".

Spill Response Specifics

Small Spills: Perform the following tasks as appropriate

- Don personal Protective Equipment;
- Remove sources of heat or ignition;
- Provide adequate ventilation;
- Stop source of leak, check containment integrity, and check position of valves;
- Separate incompatible materials;
- Contain spill;
- Protect discharge to storm water conveyances (e.g. with booms, drain mats);
- Recover oil for possible recycling;

Follow additional procedures, as appropriate, per MSDS guidance for type of oil spilled.

Large Spills: In **addition** to the specific small spill responses,

- Contain spill with suitable containment, such as booms or earthen dikes, for later recovery;
- Absorb oil with suitable material such as dry shop rags, clay type absorbent, or sand;
- Place oil with rags or absorbent into proper containers for disposal;

Follow-up: Take steps to ensure that cause of release is corrected.

2.16 Tank Cleaning & Gas Free Operations

Tank Cleaning/ Gas Free Operations are as follows:

1. DMG personnel will start by having a Marine Chemist accompany them as they begin opening sealed spaces, voids, and tank tops, starting at the bow of the ship, and working toward the stern. The Marine Chemist is to inspect all of the spaces, tanks, and voids, and either certify them safe for workers, or not safe for workers.
2. All tanks/voids to be determined to be not safe for workers will be mechanically ventilated, and then rechecked by the Marine Chemist. All openings in the deck, or less than 3 feet off of the deck, will have guards placed around them, to prevent accidental falls.
3. All openings should remain open, until cleaned, certified gas free, and inspected, so that they can naturally ventilate.
4. Marine Chemist certificates are to be maintained by a DMG Certified Shipyard Competent person, who will perform and post permits at the tank/void entrance daily.
5. It is the responsibility of all personnel to check the tank/void entrance permits prior to entry, and to report any change of condition immediately (Prior to entry).
6. Any change of condition voids the entry permit, and must be re-inspected by the Marine Chemist or Shipyard Competent Person (Where allowed under NFPA 306)
7. Mechanical ventilation is to be provided in any tanks/voids where active work is taking place.
8. Tanks/voids that have been certified gas free, and inspected/accepted by Supship should be closed, and four bolted (Or more as directed by Supship).
9. Tank cleaning will be accomplished by pumping any free standing liquids, mucking out the tanks by hand where necessary, and washing the tank out, using a double diaphragm pump to provide suction to a 2" vacuum line, and washing the tank residues toward the suction line using a 1 1/2" hose with fire nozzle.
10. Process water, wash water, and slops/sludge will be processed through portable frag tanks, to be placed in the hangar bay of the ship.
11. There will be a full time attendant to remain at the portable tank station during all pumping and tank cleaning operations. This attendant will maintain radio communication with the rest of the cleaning crew, and will also have the ability to secure the compressed air supply to the pumping/suction operation.
12. DMG will maintain a 20' ISO container, with an inventoried spill kit, onsite. Included in this spill container is the spill containment procedures which the DMG crew has been trained on, container inventory, and emergency contact and procedures.
13. All waste water, slops, sludge, ballast, bilge, sump, and process water is to be removed and processed from the frag tanks for disposal by a properly licensed disposal company.
14. It is the intent of DMG to clean and gas free the tanks/voids/piping from the bow , working aft. Piping will be flushed and blown down, and all valve bodies cycled and blown down, to the satisfaction of the marine chemist/Supship.
15. For the purposes of this project, Hot Work is to be kept to a minimum, and will only be performed where necessary. The areas around and adjacent to where Hot Work is to be performed is to be certified as "Safe For Hotwork" by the Marine Chemist, and all condition of the certificate are to be followed, including fire watches and firelines , as

2.16 Tank Cleaning & Gas Free Operations

contained in the Hot Work procedure outlined in the Safety and Health Management Plan.

All fuel and oil removed from the ship is to be disposed of by a properly licensed oil recycler.

2.17 Waste Management

Employees

- DO NOT mix different types of waste under any circumstances. Place a particular waste in the container specifically designated that type of waste ONLY.

Employer

- Ensure that waste is properly separated and placed in the proper containers.
- Ensure that waste is properly manifested, and that waste disposal records are properly maintained.
- Ensure that waste is properly disposed.

2.17.1 Segregation of Wastes

Before disposing of wastes, the wastes must be separated for proper handling and characterization. Separate disposal facilities will be provided for each of the following:

- PCBs
- Asbestos
- Fuels, Oils, and Lubes
- Chromated Water
- Mercury
- Ozone Depleting Substances
- Lead
- Electrical Cable
- Ductwork
- Ductwork Flanges containing PCB gaskets

Methods for disposing each type of waste have been outlined in the sections that address each of the wastes separately. DMG will comply with all applicable regulations described in the specific waste management procedures within this HASP.

2.18 HOUSEKEEPING

Employees

- Keep working surfaces on and around the vessel reasonably free of materials.
- Do not eat or change in areas where hazardous material removal is taking place.
- Eat, smoke, change clothing, and apply cosmetics only in designated areas.

Employer

- Provide the required facilities for proper sanitary conditions on site.
- Ensure that employees clean up their work areas properly.

2.18.1 Housekeeping in work areas

Good housekeeping conditions shall be maintained at all times. Adequate aisles and passageways shall be maintained in all work areas. All staging platforms, ramps, stairways, walkways, aisles, and passageways on vessels or dry docks shall be kept clear of all tools, materials, and equipment except that which is in use, and all debris such as welding rod tips, bolts, nuts, and similar material. Hose and electric conductors shall be elevated over or placed under the walkway or working surfaces or covered by adequate crossover planks.

All working areas on or immediately surrounding vessels and dry docks, graving docks, or marine railways shall be kept reasonably free of debris, and construction material shall be so piled as not to present a hazard to employees. Slippery conditions on walkways or working surfaces shall be eliminated as they occur. Free access shall be maintained at all times to all exits and to all fire-alarm boxes or fire-extinguishing equipment. All oils, paints thinners, solvents, waste, rags, or other flammable substances shall be kept in fire resistant covered containers when not in use.

Where dust routinely accumulates, all surfaces will be maintained as free as practical of such accumulation. Surfaces will be cleaned at least once per shift to prevent accumulation of lead dust or more frequently, if necessary. All cleaning will use methods, such as vacuuming with HEPA filtered vacuum cleaners or washing down, where feasible, observing water pollution regulations as they pertain to contaminated waste water. Wet sweeping, shoveling, or brushing will be used when other methods have been tried and found to be ineffective or unfeasible. Compressed air will NOT be used to clean work surfaces or floors.

2.18.2 Protective clothing

If an employee is exposed to a hazardous material above the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, DMG shall provide at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment. The protective clothing shall be provided in a clean and dry condition at least weekly. DMG shall provide for the cleaning, laundering, or disposal of protective clothing and equipment required. DMG shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness and shall assure that all protective clothing is removed at

2.18 HOUSEKEEPING

the completion of a work shift only in change rooms provided for that purpose as prescribed.

Contaminated protective clothing that is to be cleaned, laundered, or disposed of, will be placed in a closed container in the change-room, which prevents dispersion of lead outside the container. DMG shall inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to the hazardous material involved. The containers of contaminated protective clothing and equipment will be labeled as follows: CAUTION: CLOTHING CONTAMINATED WITH [hazardous substance]. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF [hazardous substance] CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

The removal of hazardous substances from protective clothing or equipment by blowing, shaking, or any other means which disperses the hazardous substance into the air is prohibited.

2.18.3 Hygiene facilities and practices

DMG shall assure that in areas where employees are exposed to lead above the PEL, without regard to the use of respirators, food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in change rooms, lunchrooms, and showers required under this section.

2.18.4 Change rooms

DMG shall provide clean change rooms for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators. Change rooms will be equipped with separate storage facilities for protective work clothing and equipment and for street clothes that prevent cross-contamination.

2.18.5 Showers

DMG shall assure that employees who work in areas where their airborne exposure to a hazardous substance is above the PEL, without regard to the use of respirators, shower at the end of the work shift. Employees who are required to shower will not leave the workplace wearing any clothing or equipment worn during the work shift.

2.18.6 Lunchrooms

DMG shall provide lunchroom facilities for employees who work in areas where their airborne exposure to a hazardous substance is above the PEL, without regard to the use of respirators. Lunchroom facilities will have a temperature controlled, positive pressure, filtered air supply, and are readily accessible to employees. Employees who work in areas where their airborne exposure to a hazardous substance is above the PEL without regard to the use of a respirator will wash their hands and face prior to eating, drinking, smoking or applying cosmetics. Employees will not enter lunchroom facilities with protective work clothing or equipment unless surface

2.18 HOUSEKEEPING

lead dust has been removed by vacuuming, down draft booth, or other cleaning method.

2.18.7 Lavatories

DMG shall provide an adequate number of lavatory facilities that comply with 29 CFR 1910.141(d)(1) and (2).

3.1 Hazard Communication Program

DMG has developed this hazard communication program to inform employees of materials and chemicals used or potentially used at the shipyard in accordance with OSHA regulations. This section includes a description of employee and employer responsibilities, describes the hazard communication program, details information about warning labels and material safety data sheets (MSDSs), and details employee training requirements.

3.1.1 Responsibilities

Employees

- Know how to recognize warning labels and how to follow their instructions.
- Know the physical and health hazards of the chemicals you use.
- Know how to protect yourself from exposure to hazardous substances.
- Know the location of material safety data sheets on site.
- Know what chemicals you may be required to use as part of your work tasks.
- Know the purpose of the Hazard Communication program and how it works.

Employer

- Train employees in the methods used to detect the presence of hazardous chemicals.
- Train employees about the physical and health hazards of the chemicals they use.
- Train employees on how they can protect themselves from exposure.
- Train employees on the elements of the Hazard Communication program and what they mean.
- Train employees how to read and understand MSDS's.

3.1.2 Purpose

The purpose of this section is to ensure that the hazards of all chemicals used by DMG are evaluated, and that information concerning their hazards is transmitted to all DMG employees. This transmittal of information will be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training. This section covers requirements discussed in 29 CFR 1910.1200, "Hazard Communication."

3.1.3 Scope and Application

DMG shall provide information to its employees about the hazardous chemicals to which they may be exposed by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. This applies to any

chemical that is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

3.1.4 Written Hazard Communication Program

A written hazard communication program which at least describes how the criteria specified in 29 CFR 1910.1200 (f), (g), and (h) for labels and other forms of warning, material safety data sheets, and employee information and training will be met will be made available at the shipyard. The program will also include the following:

- A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and,
- The methods which will be used to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels) and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

3.1.5 Multi-employer Workplaces

Since DMG anticipates utilizing the services of contractors, additional elements will be added to this program so that contract personnel are made aware of the chemical hazards to which they may be exposed. The hazard communication programs developed and implemented under this paragraph will include the following (in compliance with 29 CFR 1910.1200(e)):

- The methods DMG will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working;
- The methods DMG will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,
- The methods DMG will use to inform the other employer(s) of the labeling system used in the workplace.
- Subcontractors who provide services to DMG will be required to furnish copies of MSDSs to DMG for any hazardous substance that they intend to bring onto the project site.

The written hazard communication program shall be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director (of the EPA), in accordance with the requirements of 29 CFR 1915.16.

3.1.6 Labels and Other Forms of Warning

Each container of hazardous chemicals at the workplace will be labeled, tagged or marked with the following information:

- Identity of the hazardous chemical(s);
- Appropriate hazard warnings; and
- Name and address of the chemical manufacturer, importer, or other responsible party.

Each container of hazardous chemicals leaving the workplace shall be labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation. If the hazardous chemical is regulated by OSHA in a substance - specific health standard, DMG will ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

Except as provided in paragraphs (f)(6) and (f)(7) of 29 CFR 1910.1200, DMG shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information:

- Identity of the hazardous chemical(s) contained therein; and,
- Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

Signs, placards, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by paragraph (f)(5) of this section to be on a label. The written materials will be readily accessible to the employees in their work area throughout each work shift. Portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer may not be labeled.

Existing labels on incoming containers of hazardous chemicals will not be removed or defaced unless the container is immediately marked with the required information. Labels or other forms of warning will be legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. If employees

who speak other languages may add the information in their language to the material presented, as long as the information is presented in English as well.

3.1.7 *Material Safety Data Sheets*

A material safety data sheet will be maintained in the workplace for each hazardous chemical that is used. Each material safety data sheet will be in English (copies in other languages may be maintained as well), and will contain at least the following information:

- The identity used on the label, and, except as provided for on trade secrets:
- If the hazardous chemical is a single substance, its chemical and common name(s);
- If the hazardous chemical is a mixture which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself; or,
- If the hazardous chemical is a mixture which has not been tested as a whole:
 - The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that chemicals identified as carcinogens under paragraph (d) of this section shall be listed if the concentrations are 0.1% or greater; and,
 - The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health risk to employees; and,
 - The chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture;
- Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);
- The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;
- The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical;
- The primary route(s) of entry;
- The OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available;
- Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition) or has been found to be a

potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA;

- Any generally applicable precautions for safe handling and use which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;
- Any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, such as appropriate engineering controls, work practices, or personal protective equipment;
- Emergency and first aid procedures;
- The date of preparation of the material safety data sheet or the last change to it; and,
- The name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

If no relevant information is found for any given category on the material safety data sheet, the material safety data sheet shall mark it to indicate that no applicable information was found.

Copies of the required material safety data sheets for each hazardous chemical shall be maintained in the workplace and will be readily accessible during each work shift to employees when they are in their work area(s).

Material safety data sheets shall be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.20(e). The Director shall also be given access to material safety data sheets in the same manner.

3.1.8 Employee Information and Training

Employees will be supplied with effective information and training on hazardous chemicals in their work area at the time of their initial assignment and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical - specific information will always be available through labels and material safety data sheets.

Information

Employees will be informed of:

- The requirements of this section;
- Any operations in their work area where hazardous chemicals are present; and,
- The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

Training

Employee training will include at least:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
- The physical and health hazards of the chemicals in the work area;
- The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
- The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

3.2 Personal Protective Equipment (PPE)

Employees

- Wear all personal protective equipment as required.
- Ensure that all equipment fits properly.
- Use personal protective equipment properly at all times.
- Use only safety glasses, shields, and other protective gear that has been provided by DMG
- Use respirators as you have been trained.
- Assure that a proper fit is maintained at all times.
- Be sure that a proper seal is maintained whenever respirator is used.
- Store and maintain respirators as you have been instructed.

Employer

- Train all employees on how to properly use the respirators and other PPE.
- Provide all required personal protective equipment to employees.

- Ensure that all equipment fits employees properly.
- Require that personal protective equipment be properly used.
- Document the maintenance of all personal protective equipment.
- Document employee training on the use of personal protective equipment.
- Ensure safety glasses, shields, and other protective gear meet the appropriate ANSI standards.
- Evaluate tasks that require the use of respirators.
- Select the appropriate respirator based on the level of airborne contaminants and environmental conditions of exposure.
- Ensure that all persons wearing respirators have been medically evaluated for fitness.
- Fit test persons required to wear respirators.
- Properly store and maintain respirators.

3.2.1 Purpose

This program is designed to ensure protection of DMG employees from physical and chemical hazards. DMG employees are required to wear personal protective equipment in various situations as defined in Attachment 1 of this chapter. OSHA requires that DMG will supply the equipment at no cost to the affected employees.

3.2.2 Scope

Based on the hazard determination at the worksite, various DMG employees shall be required to wear personal protective equipment (PPE). If employees enter an area marked to require PPE, they must comply with those markings. This section complies with 29 CFR Subpart I, 1910.132-1910.136.

3.2.3 Definitions

DMG employees refer to DMG employees only.

Personal Protective Equipment (PPE) means equipment such as gloves, hardhats, safety glasses, and respirators that protect employees from various hazards that they are exposed to during the workday.

“Don” refers to the action of putting the equipment on.

“Doff” refers to the action of removing the equipment.

3.2.4 Responsibilities

Environmental Profiles, Inc., acting as safety and health consultant to DMG, is responsible for ensuring that the hazard determination has been performed, correct PPE has been

selected, all affected employees are wearing the required PPE, and each employee has received all of the required training.

3.2.5 Education and Training Requirements

The employer shall provide training to each employee who is required by this section to use PPE. The training requirements can be found in 29 CFR 1910.132 (f). It includes the following:

- When PPE is necessary;
- What PPE is necessary;
- How to properly don, doff, adjust and wear PPE;
- The limitation of the PPE; and
- The proper care, maintenance, useful life and disposal of the PPE.

Before being allowed to perform work where PPE is required, each affected employee must demonstrate an understanding of the training.

Retraining is required when there are:

- changes to the workplace making previous training obsolete;
- changes to the PPE making previous training obsolete; and
- knowledge or use of assigned PPE indicated that the employee has not retained the requisite understanding or skill.

3.2.6 Written Program Requirements

All areas of the workplace must be evaluated. Based on this evaluation, PPE requirements must be defined. This information must be provided in writing to all affected employees.

3.2.7 Documentation and Recordkeeping Requirements

Written certification shall be provided to verify that a required workplace hazard assessment has been performed. The form will identify:

- The workplace evaluated;
- The person certifying that the evaluation has been performed;
- The date(s) of the hazard assessment; and
- Identify the document as the certification of hazard assessment.

An example of this form can be found in Attachment 1.

The employer shall verify that each employee has received training. Written documentation of training is required. All training records must include the name of employee trained, the dates(s) of training, and identify the subject of certification.

3.2.8 General Requirements

PPE alone shall not be used to provide protection against hazards. PPE should be used in conjunction with guards, engineering controls, and sound work practices.

When PPE is required, the equipment shall be provided, used and maintained in sanitary and reliable condition, as necessary, to protect employees from workplace hazards.

Where employees provide their own equipment, the employer shall assure the adequacy, including the proper maintenance and sanitation, of such equipment. (29 CFR 1910.132 (b))

All PPE must be of safe design and construction for the work to be performed.

3.2.9 Work Place Hazards Assessment

It is necessary to assess the foot, head, eye and face, and hand hazard situations that exist in the occupational setting so that protective devices can be selected to match the particular hazard.

A walk-through survey of all areas in question shall be conducted. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration shall be given to the following basic hazard categories:

- Impact
- Penetration
- Compression (roll-over)
- Chemical
- Heat and Cold
- Harmful dust
- Light (optical) radiation
- Noise
- Electrical

During the walk-through survey, the following should be observed:

- Sources of Motion

(i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects.)

- Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.
- Types of chemical exposure
- Sources of light radiation
(i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights.)
- Sources of falling objects or potential for dropping objects
- Sources of sharp objects which might pierce the feet or cut the hands
- Layout of the workplace and location of co-workers
- Any electrical hazards
- Injury/accident data should be reviewed to help identify problem areas

Organize the data to prepare for analysis of the hazards in the environment to enable proper selection of protective equipment.

Analyze the data to estimate the potential for injury.

Each of the basic hazards should be reviewed and a determination made as to the type, level of risk and seriousness of potential injury for each of the hazards found in the area. Exposure to multiple hazards simultaneously should be considered. The workplace needs to be reassessed as necessary.

3.2.10 General Selection Guidelines

After the workplace has been assessed and the need for PPE established, the selection of the best equipment shall be made.

The selection of the PPE shall follow these general guidelines:

- Become familiar with the potential hazards and type of protective equipment that is available, and what it can do; (i.e., splash protection, impact protection, etc.)
- Compare the hazards associated with the environment; (i.e., impact velocities, masses, projectile shape, radiation, intensities, with the capabilities of the available protective equipment.)
- Select the protective equipment that ensures a level of protection greater than the minimum required to protect employees from the hazards.

3.2.11 Respirators

Limits of Respirator Usage

Engineering control measures will be used per paragraph 1-3. Compliance with PELs will not be achieved solely by the use of respirators except under the following conditions:

- During the time period necessary to implement engineering control measures;
- In work situations in which the control methods prescribed are not technically feasible or are not sufficient to reduce the airborne concentration of lead particulates below the PEL; and
- During emergencies.

A respirator program will be established as described in 29 CFR 1910.134. Where a respirator is required, it will be National Institute for Safety and Health and Mine Safety and Health Administration approved.

Qualitative fit tests will be required for all respirator users at the time of initial fitting and at least every six (6) months thereafter for all users of negative pressure respirators.

Breathing air or sources of breathing air for supplied air respirators or self-contained breathing apparatuses (SCBAS) will comply with the requirements in 29 CFR 1910.134. An employee will not be assigned to tasks requiring the use of a respirator if, base upon the employee's most recent medical examination, documentation reveals tha the employee will be unable to function normally wearing a respirator or that the safety or health of the employee will be impaired by his/her use of a respirator. A powered air-purifying respirator with HEPA filter will be provided in lieu of a half full-face piece respirator if the employee chooses to use this respirator and it provides adequate protection. A respirator will be provided to employees who work with lead, upon request. Such employees will be entered into the respiratory protection program.

Respirator Selection

Proper selection of respirators shall be made according to the guidance of American National Standard Practices for Respiratory Protection Z88.2-1969.

Permissible practice

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to the following requirements.

DMG will provide respirators when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators that are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protective program that shall include the requirements outlined in paragraph (b) of this section.

The employee shall use the provided respiratory protection in accordance with instructions and training received.

Written standard operating procedures governing the selection and use of respirators shall be established.

Respirators shall be selected on the basis of hazards to which the worker is exposed. The user shall be instructed and trained in the proper use of respirators and their limitations.

Respirators shall be regularly cleaned and disinfected. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use.

Respirators shall be stored in a convenient, clean, and sanitary location.

Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.

There shall be regular inspection and evaluation to determine the continued effectiveness of the program.

Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically (for instance, annually).

Respirators shall be selected from among those approved by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11 and 29 CFR 1910.134.

Selection of respirators

Proper selection of respirators shall be made according to the guidance of American National Standard Practices for Respiratory Protection Z88.2-1969.

Air quality

Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration shall be of high purity. Oxygen shall meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Breathing air shall meet at least the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966. Compressed oxygen shall not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with air line respirators.

Breathing air may be supplied to respirators from cylinders or air compressors.

Cylinders shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR Part 178).

The compressor for supplying air shall be equipped with necessary safety and standby devices. A breathing air-type compressor shall be used. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor shall be frequently tested for carbon monoxide to insure that it meets the specifications in paragraph (d)(1) of this section.

Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with nonrespirable gases or oxygen.

Breathing gas containers shall be marked in accordance with American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained, Z48.1-1954; Federal Specification BB-A-1034a, June 21, 1968, Air, Compressed for Breathing Purposes; or Interim Federal Specification GG-B-00675b, April 27, 1965, Breathing Apparatus, Self-Contained.

Use of respirators

Standard procedures shall be developed for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Possible emergency and routine uses of respirators should be anticipated and planned for.

The correct respirator shall be specified for each job. The respirator type is usually specified

in the work procedures by a qualified individual supervising the respiratory protective program. The individual issuing them shall be adequately instructed to insure that the correct respirator is issued.

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional man shall be present. Communications (visual, voice, or signal line) shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency.

When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby men must be present with suitable rescue equipment.

Persons using air line respirators in atmospheres immediately hazardous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous atmospheres shall be used. A standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

Respiratory protection is no better than the respirator in use, even though it is worn conscientiously. Frequent random inspections shall be conducted by a qualified individual to assure that respirators are properly selected, used, cleaned, and maintained.

For safe use of any respirator, it is essential that the user be properly instructed in its selection, use, and maintenance. Both supervisors and workers shall be so instructed by competent persons. Training shall provide the men an opportunity to handle the respirator, have it fitted properly, test its face-piece-to-face seal, wear it in normal air for a long familiarity period, and, finally, to wear it in a test atmosphere.

Every respirator wearer shall receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. The worker's diligence in observing these factors shall be evaluated by periodic check. To assure proper protection, the facepiece fit shall be checked by the wearer each time he puts on the respirator. This may be done by following the manufacturer's facepiece fitting instructions.

Providing respiratory protection for individuals wearing corrective glasses is a serious problem. A proper seal cannot be established if the temple bars of eye glasses extend

through the sealing edge of the full facepiece. As a temporary measure, glasses with short temple bars or without temple bars may be taped to the wearer's head. Wearing of contact lenses in contaminated atmospheres with a respirator shall not be allowed. Systems have been developed for mounting corrective lenses inside full facepieces. When a workman must wear corrective lenses as part of the facepiece, the facepiece and lenses shall be fitted by qualified individuals to provide good vision, comfort, and a gas-tight seal.

If corrective spectacles or goggles are required, they shall be worn so as not to affect the fit of the facepiece. Proper selection of equipment will minimize or avoid this problem.

Maintenance and care of respirators

A program for maintenance and care of respirators shall be adjusted to the type of plant, working conditions, and hazards involved, and shall include the following basic services: Inspection for defects (including a leak check), Cleaning and disinfecting, Repair, and Storage

Equipment shall be properly maintained to retain its original effectiveness.

All respirators shall be inspected routinely before and after each use. A respirator that is not routinely used but is kept ready for emergency use shall be inspected after each use and at least monthly to assure that it is in satisfactory working condition.

Self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be fully charged according to the manufacturer's instructions. It shall be determined that the regulator and warning devices function properly.

Respirator inspection shall include a check of the tightness of connections and the condition of the facepiece, headbands, valves, connecting tube, and canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration. Stretching and manipulating rubber or elastomer parts with a massaging action will keep them pliable and flexible and prevent them from taking a set during storage.

A record shall be kept of inspection dates and findings for respirators maintained for emergency use.

Routinely used respirators shall be collected, cleaned, and disinfected as frequently as necessary to insure that proper protection is provided for the wearer. Respirators maintained for emergency use shall be cleaned and disinfected after each use.

Replacement or repairs shall be done only by experienced persons with parts designed for the respirator. No attempt shall be made to replace components or to make adjustment or repairs beyond the manufacturer's recommendations. Reducing or admission valves or

regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair.

After inspection, cleaning, and necessary repair, respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators placed at stations and work areas for emergency use should be quickly accessible at all times and should be stored in compartments built for the purpose. The compartments should be clearly marked. Routinely used respirators, such as dust respirators, may be placed in plastic bags. Respirators should not be stored in such places as lockers or tool boxes unless they are in carrying cases or cartons.

Respirators should be packed or stored so that the facepiece and exhalation valve will rest in a normal position and function will not be impaired by the elastomer setting in an abnormal position.

Instructions for proper storage of emergency respirators, such as gas masks and self-contained breathing apparatus, are found in “use and care” instructions usually mounted inside the carrying case lid.

Identification of gas mask canisters.

The primary means of identifying a gas mask canister shall be by means of properly worded labels. The secondary means of identifying a gas mask canister shall be by a color code. All who issue or use gas masks falling within the scope of this section shall see that all gas mask canisters purchased or used by them are properly labeled and colored in accordance with these requirements before they are placed in service and that the labels and colors are properly maintained at all times thereafter until the canisters have completely served their purpose.

On each canister shall appear in bold letters the following:

Canister for _____ (Name for atmospheric contaminant) or Type N
Gas Mask Canister

In addition, essentially the following wording shall appear beneath the appropriate phrase on the canister label:

“For respiratory protection in atmospheres containing not more than _____ percent by volume of _____.” (Name of atmospheric contaminant)

Canisters having a special high-efficiency filter for protection against radionuclides and other highly toxic particulates shall be labeled with a statement of the type and degree of protection afforded by the filter. The label shall be affixed to the neck end of, or to the gray

stripe which is around and near the top of, the canister. The degree of protection shall be marked as the percent of penetration of the canister by a 0.3-micron-diameter dioctyl phthalate (DOP) smoke at a flow rate of 85 liters per minute.

Each canister shall have a label warning that gas masks should be used only in atmospheres containing sufficient oxygen to support life (at least 16 percent by volume), since gas mask canisters are only designed to neutralize or remove contaminants from the air.

Each gas mask canister shall be painted a distinctive color or combination of colors indicated in Table I-1. All colors used shall be such that they are clearly identifiable by the user and clearly distinguishable from one another. The color coating used shall offer a high degree of resistance to chipping, scaling, peeling, blistering, fading, and the effects of the ordinary atmospheres to which they may be exposed under normal conditions of storage and use. Appropriately colored pressure sensitive tape may be used for the stripes.

TABLE 3-1

Atmospheric contaminants to be protected against	Colors assigned⁽¹⁾
Acid gases	White
Hydrocyanic acid gas	White with 12 inch green stripe completely around the canister near the bottom
Chlorine gas	White with 12 inch yellow stripe completely around the canister near the bottom
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gases	Green with 12-inch white stripe completely around the canister near the bottom
Carbon monoxide	Blue
Acid gases and organic vapors	Yellow
Hydrocyanic acid gas and chloropicrin vapor	Yellow with 12-inch blue stripe completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases	Brown
Radioactive materials, excepting tritium and noble gases	Purple (magenta)
Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors	Canister color for contaminant, as designated above, with 12-inch gray stripe completely around the canister near the top

All of the above atmospheric contaminants	Red with 12-inch gray stripe completely around the canister near the top
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Footnote(1) Gray shall not be assigned as a main color for a canister designed to remove acids or vapors.

NOTE: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

3.2.12 Selection Guidelines for Eye and Face Protection

Each affected employee shall use appropriate eye or face protection when exposed to eye or face hazards from flying, particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Side protection must be provided where there is a hazard from flying objects.

Each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design. They may also wear eye protection that can be worn over prescription lenses without disturbing the proper position of the lenses.

Criteria (29 CFR 1910.133):

Protective eye and face devices purchased after 5 July 1994, shall comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection." If devices were purchased prior to 5 July 1994, they shall comply with Z87.1-1969.

3.2.13 Selection Guidelines for Head Protection

All head protection (helmets) are designed to provide protection from impact and penetration hazards caused by falling objects. There are three classes of helmets. The following table list the three classes.

TABLE 3-2

Class	Protection
Class A Helmet	In addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts).
Class B Helmet	In addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts).
Class C Helmet	Provide impact and penetration resistance (they are usually made of aluminum which conducts electricity) and should not be used around electrical hazards.

Each employee shall wear protective helmets when there is a potential for injury to the head from falling objects.

Helmets produced to reduce electrical shock hazards shall be worn by each employee exposed to electrical conductors which could contact the head.

Criteria (29 CFR 1910.135):

Protective helmets purchased after 5 July 1994 shall comply with ANSI-Z89.1-1986. If equipment was purchased prior to 5 July 1995, they shall comply with ANSI-Z89.1-1969.

3.2.14 Selection Guidelines for Foot Protection

Where necessary, safety shoes need to provide both impact and compression protection. Shoes in special situations need to provide puncture protection, and special electrical situations conductive or insulating safety shoes would be appropriate, and in other situations metatarsal protective shoes (steel-tipped shoes) need to be provided.

Protective footwear shall be worn where there is a danger of foot injuries due to falling and rolling objects, or objects piercing the sole, and where the employee's feet might be exposed to electric hazards.

Criteria (29 CFR 1910.136):

Protective footwear purchased after 5 July 1994 shall comply with ANSI Z41-1991. Any footwear purchased prior to 5 July 1994 shall comply with ANSI-Z41.1-1967.

3.2.15 Selection Guidelines for Hand Protection (29 CFR 1910.138)

Gloves are often relied upon to prevent cuts, abrasions, burns and skin contact with chemicals that are capable of causing local and systemic effects following dermal exposure. It is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standards(s) for the hazard(s) anticipated.

Factors to be considered for glove selection in general include:

- As long as performance characteristics are acceptable, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types.
- The work activities of the employee should be studied to determine the degree of dexterity required, the duration, the frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- Generally, any "chemical resistant" glove can be used for dry powders.
- For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest break-through time, since it is possible for solvents to carry active ingredients through polymeric materials.
- Remove the gloves in such a manner as to prevent skin contamination.

Appropriate hand protection shall be provided when employee hands are exposed to hazards such as those from skin absorption of hazardous substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes. Refer to Attachment 1 to determine when gloves are required.

3.2.16 Fitting the Selected PPE

Careful consideration should be given to comfort and fit. Ensure the right fit of equipment because continued wearing of the device is more likely if it fits the wearer comfortably. Particular care should be taken in fitting devices on equipment that is adjustable.

3.2.17 Cleaning and Maintenance

All PPE must be kept clean and properly maintained (29 CFR 1910.132 (a)). PPE should be inspected, cleaned and maintained at regular intervals. It is important to ensure that contaminated PPE that cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

3.2.18 Program Audit

Inspections should be conducted at least annually to ensure the proper selection and use of PPE. An annual hazard assessment should also be performed to ensure the potential hazards have not changed and the selected PPE is sufficient to provide a safe work environment.

3.3 Hearing Conservation Program

3.3.1 Responsibilities

Employees

- If it is hard to hear another person talking or if hearing seems affected from work in certain areas, notify your supervisor so that a noise exposure survey may be performed.
- Use supplied hearing protection appropriately wherever it is necessary.

Employer

- Areas where noise is prevalent (interferes with conversation) should be investigated to determine whether the noise exposure warrants a hearing conservation program. For instance, if it is hard to hear another person talking or if hearing seems affected from work in certain areas, a noise exposure survey should be conducted.
- Where a hearing conservation program is necessary, workers should be trained in the proper use of hearing protection. Document this training.
- Supply hearing protection to affected employees and require its proper use.
- Provide annual audiometric testing for employees.
- Maintain records of noise exposure surveys and medical monitoring.

DMG will provide protection against the effects of noise exposure when the sound levels exceed those shown in Table G-16 of 29 CFR 1910.95. When employees are subjected to noise levels exceeding those listed in Table G-16, feasible administrative or engineering controls will be utilized. If such controls fail to reduce sound levels to within the levels of Table G-16, DMG will provide personal protective equipment to reduce sound levels within the parameters of the table.

29 CFR 1910.95 TABLE G-16 - PERMISSIBLE NOISE EXPOSURES

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

NOTE: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the

individual effect of each. If the sum of the following fractions: $C(1)/T(1) + C(2)/T(2) + \dots + C(n)/T(n)$ exceeds unity, then, the mixed exposure should be considered to exceed the limit value. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140-dB peak sound pressure level.

3.3.2 Hearing Conservation Program

DMG will administer a continuing, effective hearing conservation program, as described in this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty (50) percent. For purposes of the hearing conservation program, employee noise exposures will be computed in accordance with appendix A and Table G-16a of 29 CFR 1910.95, and without regard to any attenuation provided by the use of personal protective equipment. An 8-hour time-weighted average of 85 decibels or a dose of fifty percent will also be referred to as the Action Level.

3.3.3 Monitoring

When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, DMG will develop and implement a monitoring program. The sampling strategy will be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors. Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, DMG will use representative personal sampling to comply with the monitoring requirements of 29 CFR 1910.95 unless DMG can show that area sampling produces equivalent results. All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels will be integrated into the noise measurements. Instruments used to measure employee noise exposure will be calibrated to ensure measurement accuracy. Monitoring will be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

- Additional employees may be exposed at or above the action level; or
- The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

3.3.4 Employee notification

DMG will notify each employee who is exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring. DMG will provide affected employees or their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.

3.3.6 Audiometric Testing Program

DMG will establish and maintain an audiometric testing program as provided in this paragraph by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels. The program will be provided at no cost to employees. Audiometric tests will be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician. All audiograms obtained pursuant to this section will meet the requirements of 29 CFR 1910.95 Appendix C: "Audiometric Measuring Instruments."

Baseline Audiogram

Within 6 months of an employee's first exposure at or above the action level, DMG will establish a valid baseline audiogram against which subsequent audiograms can be compared. Where mobile test vans are used to meet the audiometric testing obligation, DMG will obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees will wear hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained. Testing to establish a baseline audiogram will be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise. DMG will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

Annual Audiogram

At least annually after obtaining the baseline audiogram, DMG will obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

Evaluation of Audiogram

Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift as defined in 9.3.6 of this section has occurred. This comparison may be done by a technician. If the annual audiogram shows that an employee has suffered a standard threshold shift, DMG may obtain a retest within 30 days and consider the results of the retest as the annual audiogram. The audiologist, otolaryngologist, or physician will review problem audiograms and will determine whether there is a need for further evaluation. DMG will provide to the person performing this evaluation the following information:

- A copy of the requirements for hearing conservation as set forth in paragraphs (c) through (n) of 29 CFR 1910.95;
- The baseline audiogram and most recent audiogram of the employee to be evaluated;
- Measurements of background sound pressure levels in the audiometric test room as required in 29 CFR 1910.95 Appendix D: Audiometric Test Rooms.
- Records of audiometer calibrations required by this section.

Follow-up Procedures

If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift as defined in 9.3.6 of this section has occurred, the employee will be informed of this fact in writing, within 21 days of the determination. Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, DMG will ensure that the following steps are taken when a standard threshold shift occurs:

Employees not using hearing protectors will be fitted with hearing protectors, trained in their use and care, and required to use them.

Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

The employee will be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if DMG suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors. The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

- If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, DMG:
- Will inform the employee of the new audiometric interpretation; and
- May discontinue the required use of hearing protectors for that employee.

Revised Baseline

An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram: The standard threshold shift revealed by the audiogram is persistent; or The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

Standard Threshold Shift

As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F: "Calculation and Application of Age Correction to Audiograms."

Audiometric Test Requirements

Audiometric tests will be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency will be taken separately for each ear.

Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969, which is incorporated by reference as specified in Sec. 1910.6. Pulsed-tone and self-recording audiometers, if used, will meet the requirements specified in Appendix C: "Audiometric Measuring Instruments." Audiometric examinations will be administered in a room meeting the requirements listed in Appendix D: "Audiometric Test Rooms."

Audiometer Calibration

The functional operation of the audiometer will be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration. Audiometer calibration will be checked acoustically at least annually in accordance with Appendix E: "Acoustic Calibration of Audiometers." Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration. An exhaustive calibration will be performed at least every two years in accordance with sections 4.1.2; 4.1.3.; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

3.3.7 Hearing Protectors

Employers will make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors will be replaced as necessary. Employers will ensure that hearing protectors are worn:

- By an employee who is required by paragraph (b)(1) of this section to wear personal protective equipment; and

- By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:
 - Has not yet had a baseline audiogram established pursuant to paragraph (g)(5)(ii); or
 - Has experienced a standard threshold shift.

Employees will be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by DMG. DMG will provide training in the use and care of all hearing protectors provided to employees. DMG will ensure proper initial fitting and supervise the correct use of all hearing protectors.

Hearing Protector Attenuation

DMG will evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. DMG will use one of the evaluation methods described in 29 CFR 1910.95 Appendix B: "Methods for Estimating the Adequacy of Hearing Protection Attenuation." Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels as required by this section. For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below. The adequacy of hearing protector attenuation will be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. DMG will provide more effective hearing protectors where necessary.

3.3.7 Training Program

DMG will institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and will ensure employee participation in such program. The training program will be repeated annually for each employee included in the hearing conservation program. Information provided in the training program will be updated to be consistent with changes in protective equipment and work processes. DMG will ensure that each employee is informed of the following:

- The effects of noise on hearing;
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and
- The purpose of audiometric testing, and an explanation of the test procedures.

Access to Information and Training Materials

DMG will make available to affected employees or their representatives copies of this standard and will also post a copy in the workplace. DMG will provide to affected employees any informational materials pertaining to the standard that are supplied to DMG by the Assistant Secretary. DMG will provide, upon request, all materials related to DMG's

training and education program pertaining to this standard to the Assistant Secretary and the Director.

3.3.8 Recordkeeping

Exposure measurements

DMG will maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.

Audiometric tests

DMG will retain all employee audiometric test records obtained pursuant to this section. This record will include:

- Name and job classification of the employee,
- Date of the audiogram,
- The examiner's name,
- Date of the last acoustic or exhaustive calibration of the audiometer, and
- Employee's most recent noise exposure assessment.

DMG will maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

Record Retention

DMG will retain records required in this paragraph for at least the following periods. Noise exposure measurement records will be retained for two years. Audiometric test records will be retained for the duration of the affected employee's employment.

Access to Records

All records required by this section will be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20 (a)-(e) and 1910.95(m)(4)(i)(g)-(i) apply to access to records under this section.

Transfer of Records

If DMG ceases to do business, DMG will transfer to the successor employer all records required to be maintained by this section, and the successor employer will retain them for the remainder of the period prescribed in paragraph (m)(3) of 29 CFR 1910.95.

The Dominion Marine Group Shipyard at 425 Campostella Road, Norfolk, Virginia has a double lockable chain link security fence. The primary security gate allows for ingress/egress from Avory Avenue/Campostella Road into the DMG Shipyard. This gate is normally unlocked during normal business hours but in a closed position. The second lockable security gate allows access into the waterfront facility and consists of a 6-foot high chain-link gate. It is the responsibility of all DMG managers, supervisors, and employees to monitor shipyard security. Both security gates will be posted with the requisite warning signs, and signage requiring unauthorized persons to report to the project office.

The following actions must occur when the ship arrives at the DMG Shipyard:

1. Vessel is to be moored in accordance with a ship specific mooring plan
2. Surveyor is to survey and make any recommendations to ensure that vessel is properly moored and safe for heavy weather, and is to make a full report to Shipyard Program Manager and Insurance Underwriters.
3. Locked gangway properly installed, inspected and secured.
4. Gangway gate posted with warning sign similar in wording to that shown below

REGULATED WORK AREA

Authorized Personnel Only

Approved Personal Protection Equipment Must Be Worn

5 Contingency Plans

5.1 Emergency Procedures

Employee

- Contact your supervisor immediately in the event of an emergency.
- Know the location of the nearest hospital to the site.
- Know how to contact the fire department in case of a fire emergency.
- Know the procedures to follow in case of a fire, medical, or severe weather emergency.
- Know the location of the first aid kit.

Employer

- Know the location of the nearest hospital to the site.
- Know how to contact the fire department in case of a fire emergency.
- Know the procedures to follow in case of a fire, medical, or severe weather emergency.
- Know the location of the first aid kit.

5.2 Medical/Injury

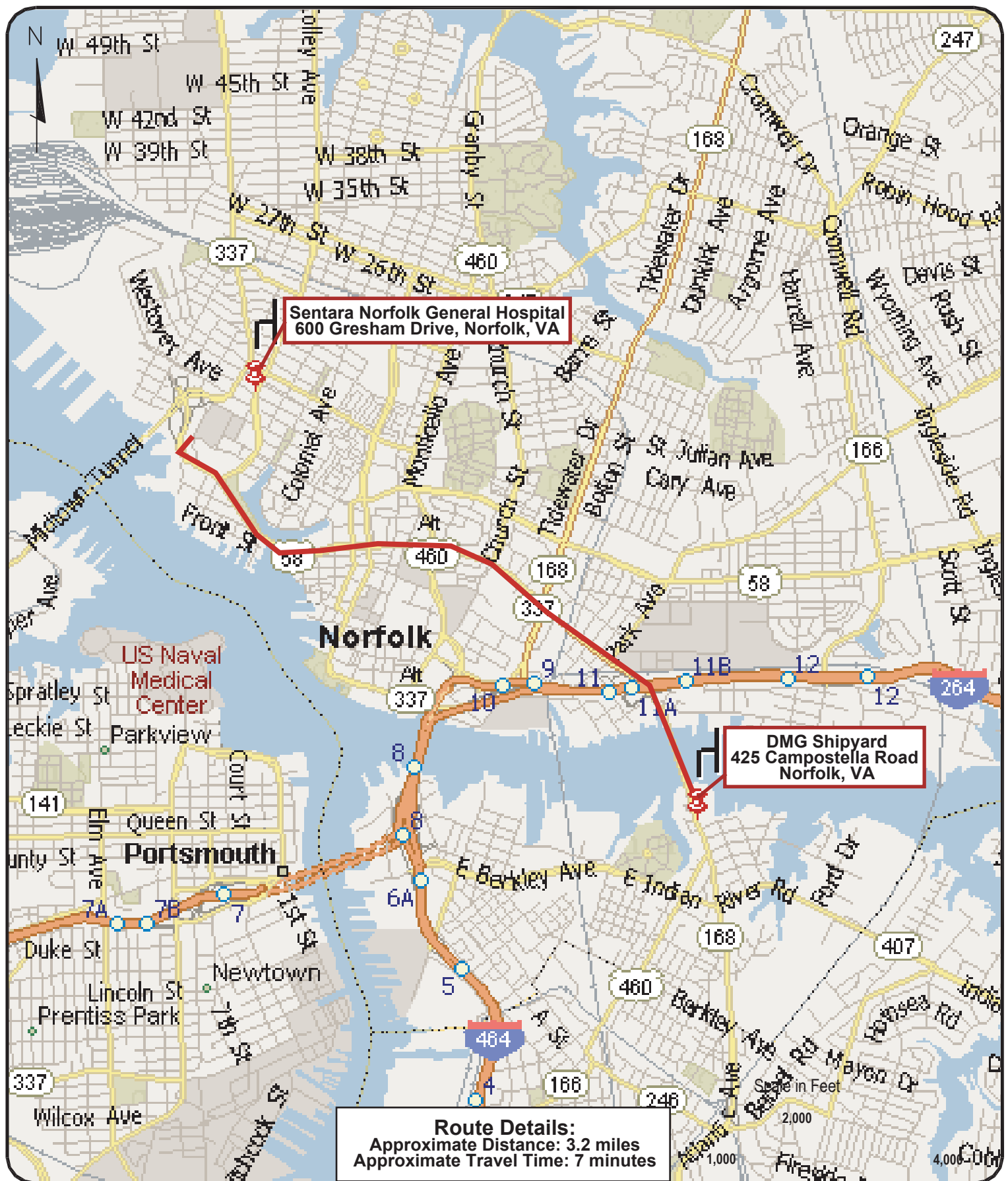
In the event of a medical emergency, the injury should be assessed to determine its severity. If the injured employee is able, he/she should proceed to the nearest hospital.

From the **DMG facility** in Norfolk, Virginia, go to:

Sentara Norfolk General Hospital, 600 Gresham Drive, Norfolk (757-668-3000)

Proceed out of the shipyard and take a left at the light next to the Hardees onto Campostella Road and up onto the bridge. Continue straight through town passing Scope and going over the little bridge next to NOAA and PETA. Go through the light at Brambleton and Colley, take the next right into the hospital entrance marked Emergency Entrance. Total trip is about 7 minutes. Distance is about 3.5 miles. A route map from the DMG shipyard to the hospital is provided as Figure 7.

If the employee is not able to proceed to the hospital him/herself, the local emergency response team should be notified immediately by dialing 911. Be prepared to give the operator the address of the site, the location of the injured worker on the site, and the nature of his/her injury. One employee should proceed to the entrance to the site in order to direct the emergency workers to the injured person.



TITLE

DMG Shipyard to Sentara Norfolk General Hospital



277 Bendix Rd., Suite 500
Virginia Beach, VA 23452
Telephone: (757) 499-4224
Fax: (757) 473-8214

DMG
425 Campostella Road.
Norfolk, VA 23523

DATE
1-14-05

DR
LAG

CK
EMD

JOB NO. 11655890.10000

SKETCH NO.

Figure 7

5 Contingency Plans

The employee(s) trained in first aid are:

Tim Mullane, DMG Program Manager (cell 757-675-0301)
Ed Dullaghan, EHS Supervisor (cell no. 757-717-2512)

One or more of these employees should be notified immediately in case of an emergency and directed to the location of the injured worker

First Aid Training

The employees designated above as being trained in first aid for the site will have the following training:

- Standard First Aid
- Adult CPR
- Bloodborne Pathogens
- Use of PPE while rendering first-aid

Unless a first aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close at hand, shall be qualified to administer first aid to the injured. The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item. The contents of such kit shall contain a sufficient quantity of at least the following types of items:

- Gauze roller bandages, 1 inch and 2 inch.
- Gauze compress bandages, 4 inch.
- Adhesive bandages, 1 inch.
- Triangular bandage, 40 inch.
- Ammonia inhalants and ampules.
- Antiseptic applicators or swabs.
- Burn dressing.
- Eye dressing.
- Wire or thin board splints.
- Forceps and tourniquet.

The contents of the first aid kit shall be checked before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

There shall be available for each vessel on which ten (10) or more employees are working one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the

5 Contingency Plans

hoisting gear, except that no more than two stretchers are required on each job location. A blanket or other liner suitable for transferring the patient to and from the stretcher shall be provided. Stretchers shall be kept close to the vessels. This does not apply where ambulance services which are available are known to carry such stretchers.

5.3 Fire

The local fire department may be reached by dialing 911. In the event of a fire emergency, be prepared to tell the operator the site address, the location of the fire on the site, and the nature of the event which started the fire (i.e., electrical short, gas line leak, etc.), if known. Designate one employee to proceed to the entrance to the yard in order to direct the fire fighters to the location of the fire.

5.4 Bloodborne Pathogens

Workers who may be required to administer first aid to others will be trained in procedures to avoid contact with any bloodborne pathogens, in accordance with 29 CFR 1910.1030.

5.5 Severe Weather

The DMG Shipyard is within what has been typically described as a “hurricane hole”. This description was earned by the fact that the cove is protected with land on three sides, and buildings and trees to lessen the strength of the wind. In the event of predicted heavy weather all moorings should be double-checked, lines doubled up, and, if necessary, anchors deployed.

Severe weather is a very realistic hazard on the Atlantic Coast. To prepare for any potential severe weather situations, the following procedures have been developed. These procedures are to be implemented in the event of a severe weather watch or warning.

5.5.1 Hurricane/Tornado

- All portable buildings will be anchored to the ground.
- Other structures such as box vans will be anchored or moved to a safer area.
- If at all possible, light scrap will be shipped out prior to the severe weather event. If this is not possible, heavier pieces of iron will be used to cover the scrap.
- Objects capable of becoming airborne will be secured.
- Cranes will be boomed down and secured.
- Hoses and tools will be picked up and secured.
- Vessels in the slip shall be reinspected and secured with extra line using pieces of equipment as extra anchors.

5 Contingency Plans

- Oxygen and gas will be turned off at the main connection
- Power to the vessel will be shut down.
- After everything has been secured, the facility will be evacuated.

5.5.2 Lightning

- Workers on the vessel and in the yard will stop work and stand by under cover.
- All power to the vessel will be shut down.
- Oxygen and gas will be turned off at the main connection.
- Cranes shall be boomed down.
- All personnel will seek shelter.

5.6 Oil Spills

Federal law requires the U.S. Coast Guard responds to, assess, and investigate all spills and potential spills. In the event of a spill, the USCG will be contacted via the National Response Center at 800-424-8802.

DMG will maintain a complete copy of this TCP, its VPDES Permit, its SWPP Plan, and its Spill Response Plan at the shipyard, and it will be located in such a way that it would be readily available to all DMG employees and the Regional Administrator for on-site review during normal working hours.

This facility has never accidentally discharged oil in harmful quantities into or upon the navigable waters of the United States or adjoining shorelines in two spill events, reportable under section 311(b)(5) of the FWPCA, occurring within any twelve-month period.

Management gives its full approval and has committed the necessary resources to implement the Spill Response Plan. The plan shall include the following sections:

- management approval;
- spill reporting procedures;
- pre-spill planning for major pollutant spill areas;
- description of spill containment design;
- description of spill clean-up equipment/facilities;
- spill training procedures;
- spill response procedures reflecting current facility design/layout and responding personnel;
- Spill reporting procedures to government agencies; and
- description of inspection and recordkeeping procedures pertaining to spill equipment.

Floating booms will surround each vessel to be dismantled upon arrival and prior to the start of any work on the vessel. In the event that a spill occurs, a trained crew will be on hand with the appropriate equipment to clean up the spilled oil. This equipment will include absorbent pads, skimmers, boats, and machinery to quickly and effectively clean up the spill. Provided below is a summary of the spill response plan.

5.6.1 Responsibilities

Personnel have been instructed in the operation and maintenance of equipment to prevent the discharges of oil and applicable pollution control laws, rules and regulations. The following persons have been designated as being accountable for oil spill prevention, management and reporting:

Mr. Tim Mullane, DMG Shipyard Manager
Mr. Marc McPherson, SIMS Metals Division Manager
Mr. Charles Burkes, SIMS Metals EHS Officer

Spill prevention briefings are scheduled and conducted for facility operating personnel at one month intervals to assure adequate understanding of the Spill Response Plan for the facility. These briefings include topics such as known spill events or failures, malfunctioning components, and recently developed precautionary measures.

5.6.2 Training

Facility personnel have been properly instructed in the procedures to respond to discharges of oil and in applicable oil spill response laws, rules, and regulations. The training is functional in nature according to job tasks for both supervisory and non-supervisory operational personnel and includes specific lesson plans on subject areas relevant to facility personnel involved in oil spill response and cleanup.

5.6.3 Summary of Spill Response Procedures

NOTE: IN CASE OF FIRE, PROTECT HUMAN LIFE AND SAFETY, AND TAKE APPROPRIATE STEPS TO PUT OUT THE FIRE FIRST. THE CONTROL OF SPILLS IS SECONDARY TO SUCH CONCERNS.

In Advance

Familiarize yourself with locations, contents, and appropriate use of spill kits (e.g. pads, booms), absorbent materials, waste drums, shovels and brooms, appropriate personal protective equipment (e.g. rubber gloves, safety goggles); and Material Safety Data Sheets (MSDS).

At Time Of Spill

When an oil spill is discovered, the employee discovering the spill must immediately stop the source of the oil and commence containment of the spill in as small an area as possible. The

employee will promptly report spill to his Supervisor who will contact the Shipyard Manager to determine reporting requirements. The Supervisor and/or Shipyard Manager will dispatch additional personnel and equipment as required to assist in containment of the spill. The Shipyard Manager will provide any required notifications to government agencies and recommend options for cleanup, storage, and disposal of spill residue. The Shipyard Manager will log the event on the "Spill Log".

Spill Response Specifics

Small Spills: Perform the following tasks as appropriate

- Don personal Protective Equipment;
- Remove sources of heat or ignition;
- Provide adequate ventilation;
- Stop source of leak, check containment integrity, and check position of valves;
- Separate incompatible materials;
- Contain spill;
- Protect discharge to storm water conveyances (e.g. with booms, drain mats);
- Recover oil for possible recycling;

Follow additional procedures, as appropriate, per MSDS guidance for type of oil spilled.

Large Spills: In **addition** to the specific small spill responses,

- Contain spill with suitable containment, such as booms or earthen dikes, for later recovery;
- Absorb oil with suitable material such as dry shop rags, clay type absorbent, or sand;
- Place oil with rags or absorbent into proper containers for disposal;

Follow-up: Take steps to ensure that cause of release is corrected.